

# The Mining Journal

Established 1835

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LONDON, FEBRUARY 16, 1951

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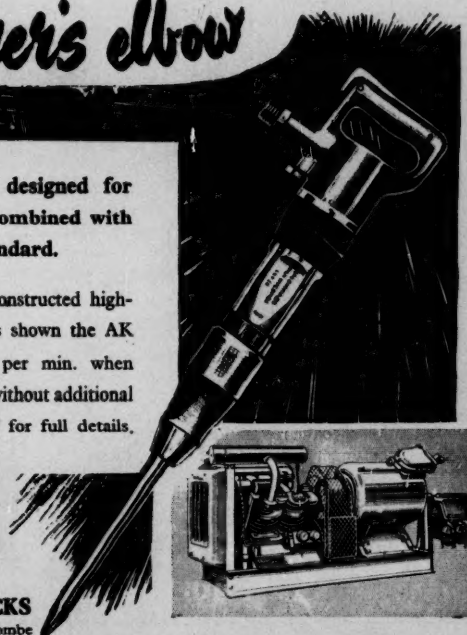
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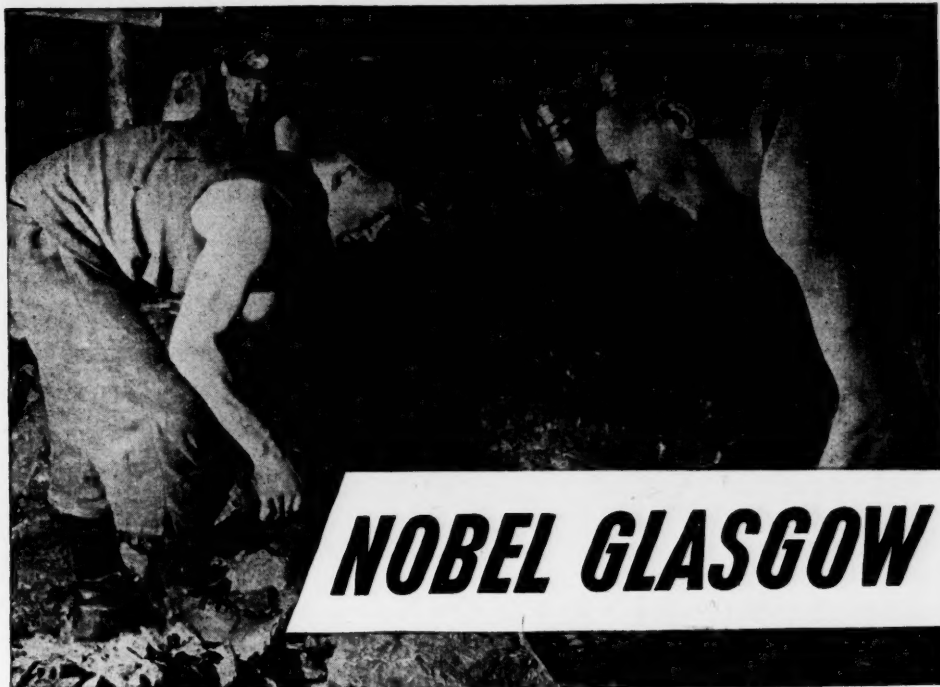
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## THIS WEEK'S FEATURES

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## NOTES AND COMMENTS

### Steel in Transition

Having accomplished his main purpose—the transfer of the steel industry to State ownership—the Minister of Supply seems to be willing, even anxious, to placate the Opposition by his acceptance of the inevitability of gradualness. During the early days of transition there is to be no interference with day-to-day operation of the works. The 92 companies and their subsidiaries whose securities are now vested in the Iron and Steel Corporation are not only to retain their individualities, but are encouraged to compete one with another as heretofore, and the British Iron and Steel Federation, whose membership embraces many private companies which have escaped the net of nationalization, is invited to consult and co-operate with the Iron and Steel Corporation. As an earnest of his sincerity in this respect, one of the two nominees chosen by the Minister of Supply to organize the regular flow of steel for re-armament, is the former commercial and technical director of the B.I.S.F., and there remain four or more vacancies on the Steel Corporation which, it is hoped, may be filled by leaders of the steel industry who, now that vesting day is past, may be induced to abandon their uncompromising attitude of opposition to State ownership.

At a Press conference held on Tuesday, the chairman of the Iron and Steel Corporation, Mr. S. J. L. Hardie, revealed next to nothing about the policy to be pursued by this powerful new State organization. He appealed to the industry to bury political hatchets and urged experts to give their service. On the future level of steel output, he said, that an announcement might be made in the near future, and the Corporation was to enter into a long-term contract with the Coal Board about supplies of coal and coke, but he was not specific on the iron ore supply position both in respect of domestic and foreign ores. Much will depend on the outcome of the current negotiations between the Corporation and the Iron and Steel Federation, which are centred on the question whether the Corporation's representatives should become members not merely of the Federation's Executive Committee, but also of its development and other sub-committees. Should this happen, the Federation's structure would be changed beyond recognition.

In any event, although the changes may be gradual, the consequences of this week's momentous transfer will be far-reaching. Henceforth, the State becomes responsible for almost 100 per cent of the crude steel production and varying proportions of the output of finished steel

products. One of the anomalies of the new set-up is that whereas many engineering and bridge-building companies retain their independence, the State as the owner of about one-third of the structural engineering capacity becomes their most formidable competitor—formidable because the independent companies are now wholly dependent upon the Steel Corporation for their supplies. Clearly there is need for close co-operation between the new régime and the private companies to ensure the continued prosperity of the engineering industry.

And, finally, the industry awaits with profound interest, not unmixed with anxiety, the terms of the new Government stock which steel shareholders are to receive in exchange for their securities. In any event, compensation terms are held to be far below intrinsic values, and on this account it is held that the Treasury can afford to be generous.

### Mr. Nkrumah Explains His Policies

The results of the Gold Coast election have now confirmed the forecast contained in last week's article entitled "Background to the Gold Coast Elections," in which it was stated that the Convention Peoples Party would gain an overwhelming majority of the 38 seats contested by popular vote. Mr. Nkrumah's party, the C.P.P., gained 34 out of the 38 seats directly elected and of the total number of members returned to the Assembly, the final reckoning gives the C.P.P. 38 seats, that is, one more than the combined African Opposition. After the elections, Mr. Nkrumah asserted that his party could count on the votes of ten more members (Independents) on major questions of policy. This is not to be taken to mean that he has, therefore, a clear majority in the Assembly on all questions of policy.

In fact, all evidence points to major questions of policy being concerned with matters domestic rather than political and constitutional. However, there is no doubt that the C.P.P. will have a clear majority on policies designed to effect social and economic reforms because if there is one matter on which almost all West Coast Africans are agreed, it is that improved standards of living are supremely necessary.

Yet, if Nkrumah, now released from gaol by the Governor, means to achieve his ends without counting the cost, he gave no sign of it. True he did say at his Press conference that he thought the new constitution was "bogus and fraudulent" and here he made it clear that this was because the Permanent Secretaries, the Chief

Secretary, the Attorney General and the Finance Secretary, who will be Europeans, are beyond the influence of the Government. But he also said, and this is more to the point, that he thought it worth while to give it a trial, for it was to the advantage of the country to do so. He had, he stated, come to this conclusion after seriously considering the examples of Jamaica, Ceylon and India. These are not the words of an extremist, but rather of a politician who, having achieved his immediate end, in this case public office and a chance to exercise power, is compelled to show a brave front to his followers, while at the same time serving notice that he is willing to co-operate in matters relating to the interest of the Colony as a whole.

Further evidence that he has no intention of overturning the economic structure of the Gold Coast was his declaration that his party had not thought of nationalizing the Gold Coast's industries. His policy, he said, was to expand industrial activity in the Gold Coast by a five-year plan of industrialization aimed at improving the people's standard of living—a policy which demands encouragement.

Turning to the subject of education, Nkrumah said that the C.P.P. wanted free compulsory education introduced in the Colony, and that his party were prepared to put up a strong fight for its attainment. Continuing, he said that his party would demand that "Britain returns to us cocoa money, that is, money in the Gold Coast's cocoa price stabilization fund." (Last week, the Secretary for Development, Mr. Norton Jones, said that the amount in this fund amounted to £50,000,000 sterling.) Referring to more controversial matters, the leader of the C.P.P. declared that "We shall remain within the British Commonwealth of Nations. We are not even thinking of a republic."

Thus, it can be seen that now the C.P.P. is faced with exercising power allied to responsibility, a more common-sense approach has begun to prevail. Nor could it be otherwise. For the hopes and aspirations of African people, not only in the Gold Coast, but also in Nigeria, Tanganyika, the Rhodesias and elsewhere in Africa, are anxiously awaiting the outcome of how the first African majority ever to hold such a large measure of power will handle the affairs of State. If Nkrumah and his party bungles the task which confronts them, the other Colonies' hopes of progressing further along the road to self-government will receive a severe setback. On the other hand, if they are successful a new chapter in the history of the British Empire and Commonwealth as well as in the history of the African will have begun.

#### British Mining Productivity Team for U.S.A.

Already in 1913, output per manshift in the U.S. bituminous coal mines amounting to 3.22 statute tons, was higher than the British figure for June, 1914, of 1.016 statute tons. This gap widened further in the inter-war period: in 1928, this country's output amounted to 1.065 as compared with 4.22 in the U.S., and the respective figures for 1938 are 1.148 and 4.37 statute tons. The fact that natural conditions in the U.S. are far more favourable than in this country—depths seldom exceeding 1,200 ft., flat seams, absence of faults and water, and clean coal of good quality—is only a partial explanation of this discrepancy: higher O.M.S. across the Atlantic was the result of the system of mining adopted with efficient underground haulage, fewer restrictions on the use of electricity and, above all, as pointed out in the Reid Report (H.M.S.O., Cmd. 6610) to the comprehensive face mechanization. It is not out of place to recall that in 1939, 88 per cent of the U.S. underground output was cut by machines. Since then, further technological progress has been made and "machinery is now available which goes a long way towards the complete mechanization of coal winning." The achievements of U.S. bituminous coal mining

have, of course, been the subject of a good deal of research by other coal producing countries, and although there can be but little that is not known, only good can come of the decision to send a British team of 16 to study productivity in the U.S. coal industry. Needless to add, the tour, which is organized by the Anglo American Council on Productivity with the technical assistance of E.C.A., is of paramount importance in view of the chronic crisis which is afflicting this country's coal mining industry—the pioneer of world coal mining. The itinerary has been planned to include a dozen U.S. bituminous coalfields where conditions are in some measure comparable to those in this country.

The principal point on the agenda is to study methods designed to increase output with economy in manpower; in addition, members of the team will inspect American mining equipment, including coal-cleaning plant, and will confer with the American National Coal Association. Since the crisis in the British coal mining industry is due, in no small measure, to psychological factors, the organizers of the tour have wisely included into the programme the study of consultation and conciliation methods as practised in the U.S., welfare matters and trade union procedure. This team will have every opportunity to examine the U.S. coal mining industry in all its major aspects, and its report will eventually contain many interesting and valuable recommendations addressed to those responsible for the efficient working of Britain's coal mines. However, it is not inopportune to conclude by pointing out that a number of productivity teams which have investigated several important U.S. industries in recent years have produced reports full of valuable recommendations on how to increase productivity over here—but no data are as yet available to show that they are actually being carried out. Greater productivity in the British coal mining industry—one of the main pillars of the country's economic system—must be attained as soon as possible and the team's report—and its implementation—will be awaited with unusual interest in the country.

#### Indian Rare Earth Mineral Research

More intensive research work is now being done in India with a view to exploiting the country's resources of thorium, titanium, beryllium and zirconium, states a Reuter report from Bombay. Although strict secrecy surrounds the progress of the work, Mr. G. C. Mitter, President of the Bombay Metallurgical Society, has admitted that considerable advances have been made in the processing of the raw materials from which the metals are extracted.

The Government is setting up a factory to process the beach sands of South India, which are known to contain thorium and possibly, uranium. Production of beryllium is now the subject of active research, aided by India's Atomic Commission. Large deposits of beryl have been discovered in Rajputana, and it is also being obtained from the accumulation of the mica mines.

Titanium is found as titaniferous ore in the chrvstalline rocks of South India and in the mica deposits of Bihar and Orissa. It accompanies wolfram at Degana, in Rajputana, and occurs plentifully in the black sands on the Travancore coast, in South India. In 1938, 252,000 tons of titanium were produced in India, but details of the present output are not available.

Zirconium is found with ilmenite ore in the beach sands of Travancore and is a refractory material. According to geological experts, India has a sizeable share of the world's resources of coal and iron. She also has limited resources of petroleum in Upper Assam. The provinces of Bihar and Orissa are rich in high-grade iron ore, estimated at 100,000 million tons.

## South Africa

(From Our Own Correspondent)

Johannesburg, February 1

Final figures for some of South Africa's mining activities are putting bright finishing touches to 1950, which now stands out against the duller background of recent years. The chief colour scheme, of course, is gold, spangled with diamonds.

Viewed in terms of value, results of the gold mining industry were the best in the country's history. The total value of output was £144,710,814, which exceeded the value in 1949 by about £30,000,000 and surpassed the 1941 record by nearly £24,000,000. The reason, obviously, was that 1950 was the first full year at the higher price of gold.

The volume of production fell a little short of the 1949 level, but was in fact very well maintained in view of the lower grade worked during the year. Total production was 11,659,280 oz. compared with 11,708,013 oz. The 1941 volume of 14,386,361 oz. still remains the record by far (at that time the price of gold being only £8 8s. an oz.). This record, too, may be broken, however, when the new producers are working at a reasonable capacity.

In any case, the volume of production, as such, is no criterion, the important aspect clearly being the relation of the price of gold to the prices of other commodities. In other words, if full allowance could be made for the change in the price level since 1941, last year's record value of gold output would not look so striking.

A useful method of countering part of that discrepancy in price levels was the system of premium gold sales, which last year realized £2,123,547 compared with £1,066,286 for 1949, when the arrangement was in force for only part of the year.

Nevertheless, it is essential to keep the volume of production as high as economically possible, whatever the price of gold, and the progress of the developing mines is of good augury in that respect.

### ST. HELENA & WELKOM TO CRUSH IN MID-SUMMER

In the Free State no fewer than six of the 13 mines are now working on construction of their reduction plants. St. Helena and Welkom are expected to complete their plants in about five months' time. St. Helena will start production as soon as the reduction plant is finished, but it is possible that Welkom may start milling a little later, for development is not so far advanced as it is at St. Helena.

The two Freddie's mines' plants were started about a month ago, and may be finished by about April next year, when the mines should start work. Work is already in progress on the Western Holdings reduction plant, and the latest mine to begin construction is Free State Geduld.

In the Transvaal, West Driefontein has started preliminary work on its reduction plant, while Stilfontein is preparing the foundations. If Doornfontein keeps to its expedited programme on its pilot plant there should be nine new mines in operation by the end of next year. Of those, three—St. Helena, Welkom and West Driefontein—will start up this year, but it is doubtful whether they will have got sufficiently into their stride to make a really significant difference to the industry's results. Next year, of course, the difference should be marked.

### BLYVOORUITZICHT'S EXCELLENT REEF CONTINUITY

The last quarter's development results of this year's potential producers were particularly encouraging. Outstanding was West Driefontein, whose average of 1.098 in.-dwt. in the quarter has already been widely discussed. An important point that seems to have received less attention is that the whole of the 2,000 ft. sampled by Bly-

vooruitzicht in its 3,549 ft. drive into the West Driefontein property was payable, and averaged 781 in.-dwt. That is even more important than the high value obtained at the West Driefontein end of the drive, for it shows excellent continuity, which makes for consistently good values when stoping starts. Apart, possibly, from Western Holdings and Free State Geduld, whose inter-shaft drive may or may not produce phenomenal results around the Geduld borehole area, West Driefontein seems likely to be one of the most interesting of the new mines.

Welkom's result of 561 in.-dwt. for the last quarter's development and the 377 in.-dwt. result obtained by St. Helena were both well above previous values. While the three new mines due to start this year may take a little time to reach full production, they will make a strong addition to the producing team.

So far as labour is concerned, all that can be said at the moment is that up to now there is no shortage in the Free State. The trend continued to defy the decline in the total supply between August and November (the latest month for which an analysis of figures into districts is available). In those four months the Free State supply rose by 1,824, while the total supply for the gold mines fell by 17,210. At 18,039 in November, the Free State labour force was again approaching the record of 19,849 reached in May last year. Since the supply normally rises in the early months of a year, that peak will probably be exceeded in the next month or so.

### DIAMOND SALES MAY EXCEED £13,000,000

The record value of diamond sales by the Central Selling Organization last year (£50,967,041 against £28,444,186 in 1949 and the previous record of £38,058,843), made on behalf of South African and other producers, gave a hint that the South African mines had done better than usual.

Details of South African sales will not be known for a while yet, but the latest figures, covering the first ten months of last year, give quite a good idea of the big improvement. They indicate a possible total in the region of £13,000,000 for the year, which would be the best for 31 years. If they exceed £13,379,662, received in 1919, sales will set up a new high record for South Africa.

For the ten months, 1,425,455 carats were sold, valued at £10,174,614. By that time the weight had almost reached the total of 1,494,527 carats sold in the whole of 1949 and had passed the value of that year's total sales (£10,035,484).

Sales by the Central Selling Organization in the last quarter of the year were £15,864,065 compared with £13,286,693 in the third quarter, the difference being accounted for by a sharp increase in sales of industrial stones. It is reasonable to suppose that South Africa shared in that increased figure. Against an average of just over £1,000,000 a month for the ten months, sales in October totalled £1,386,505. Assuming that sales in the last two months of the year averaged £1,250,000 a month, the year's total would be nearly £12,700,000. It could easily be well above that figure.

In answer to numerous inquiries by shareholders, the S.A. Minerals Corporation has announced that the investigation of its manganese claims in South-West Africa continues to reflect grades no less valuable than originally disclosed, and, further, that the area of the deposits has been proved to be more extensive than previously indicated.

Production has started on 28 of the corporation's 68 claims, and a trial shipment of manganese ore is at rail-head awaiting dispatch overseas. The ore for shipment, sampled at railhead, is representative of the deposits and reflects: Manganese, 51.95 per cent; iron, 4.93 per cent; silica, 12.16 per cent.

# Advances in Technological Work on Coal

By GRAHAM OLDHAM, B.Sc., F.R.I.C., D.L.C., A.M.Inst.F.

In this article, recent advances which have occurred since our last review [*Mining Journal*, 1948, 231, 596 & 837] are dealt with. The subject matter will not, however, include topics to which the reader's attention has already been drawn in earlier issues.

In the past two years, a number of progress reports on mechanical mining in American bituminous and anthracite mines have been published by the U.S. Bureau of Mines. The methods of mining in ten bituminous coal mines have been described by L. A. Turnbull and L. A. Toenges<sup>1</sup>. An important point raised by the authors in dealing with the extraction of pillars is that the system used must aim at obtaining regular settling of the roof in order to relieve, as far as possible, the pillars next in order for extraction. It is stated, based on working in some 50 mines, that with pillar extraction the production per man-hour is less than without extraction.

## NEW MINING MACHINERY

In the field of anthracite mining, two interesting mining machines have been described by J. W. Buch and A. Allan<sup>2</sup>. The first, the Bureau of Mines scraper-shaker loading machine for driving gangways, consists of an air-driven scraper having a boom slanting upwards at 5°. This can be extended by means of conveyor troughing to suit mine cars of varying height. The discharge is on to a roof shaker conveyor situated above the cars. The machine is intended for use in steeply pitching seams and various improvements are being, or have already been carried out, on the original design.

The second machine which has been tested is the German Eickhoff shearing machine model D.E.K. The machine has an endless track chassis which carries a cutter bar and air turbine motor, rotatable about a vertical axis. The machine, which cuts a kerf 3 in. wide and 6 ft. deep, is held by pneumatic roof jacks. Cutting tests with this machine show that its performance is satisfactory and, with the introduction of certain improvements, it can be used for working in sloping seams.

Other coal mining machines, the Colmol and Joy types, have been described by J. V. Beall<sup>3</sup>. The latter, which has a ripper bar, can mine two tons per minute. In addition, it can also support the roof and assist in the placing of timber. The former has a floor shearing blade which removes coal from the face to the loader. It is also equipped with rotary chipping heads.

The method of working in the thick South Staffordshire coal seam has been discussed by B. Price<sup>4</sup>. The various methods in use at present include working by longwall facing at a height of 6½-7 ft., machine cutting and conveying, and then working the bottom section. This method of working the top section first has resulted in the elimination of bumps and frequent fires by destressing the seam. The other method of working is by room and pillar, using shortwall cutters and loading machines. The various methods are all described by the author in considerable detail.

The use of packing machines in coal mines has been reviewed by H. Kuhlmann<sup>5</sup>. The various machines which are at present in use are described and an estimate of costs is also made. J. Taylor has discussed the physical processes of coal blasting which, he points out, differ as between propellant and detonating explosives. With propellant explosives the charge first builds up to the shot hole rupture pressure of the order of a few tons per sq. in. The shot hole then ruptures and, by this time, only a small portion of the charge has been consumed. The remainder may react in the shot hole or breaks at pressures around 200 lb. per sq. in. The explosive must have a high rate of

reaction at this pressure. In the case of detonating explosives, primary cracking is caused by the shock wave, and the secondary blasting effect is caused by gas expansion. A great deal of the blasting in this case is also probably carried out at fairly low gas pressures. Rock bursts which have occurred in the West Wales coalfield have been discussed by R. F. Pescod<sup>6</sup>. Over one hundred well authenticated cases are described by the author who also advances possible reasons and suggests precautionary measures.

## DIESEL ENGINES UNDERGROUND

The use of Diesel engines underground has introduced a number of problems, some of which have yet to be solved. The two main problems are, firstly, the health hazard, and secondly, the ignition hazard. An investigation by R. F. Davis and M. A. Elliott<sup>7</sup> into methods for the removal or reduction of irritating fumes from Diesel exhausts is worthy of note. The exhaust gases may contain, amongst other things, carbon monoxide, nitric oxide and aldehydes, but the irritant properties are due to the aldehyde content. It is found that Weber's law, which states that sense reaction is proportional to the log of the stimulus, holds when applied to aldehyde concentration. The threshold of odour perception, calculated as formaldehyde, occurs at a concentration of between 0.2 and 0.3 parts per million. Nasal and eye irritation commences at a concentration of about one part per million. Attempts were made to scrub out the aldehydes with water, using a bubbling type scrubber. The experiments showed, however, that aldehydes could not be removed adequately by this method and in no test was the gas non-irritating or odourless. Oxidation of the aldehydes by chromic acid was fairly effective, but the problem of corrosion was acute in this case. Aqueous sodium sulphite was found to be quite efficient, but its oxidation by the oxygen in the exhaust was rapid. This difficulty was overcome by the addition of quinol as an inhibitor. A full-scale test was carried out using 10 gallons of 10 per cent aqueous sodium sulphite containing 0.5 per cent quinol. The Diesel exhaust inlet concentration was over 30 parts per million and some 45,000 cu. ft. of gas were scrubbed at a scrubbing temperature of 56°C. During a 15-hour run, over 90 per cent of the aldehyde content was removed and during the first seven hours removal was practically complete.

Work carried out by the U.S. Bureau of Mines on the use of Diesel engines underground has been discussed by M. A. Elliott<sup>8</sup>. The author deals with ignition hazards at both the intake and exhaust and points out that adequate ventilation is absolutely essential. Ignitions of an explosive atmosphere by the exhaust can be effectively prevented by using a 0.02 in. spaced plate flame arrestor. Quite apart from the ignition hazard, it is pointed out that engines may be damaged by operation in an atmosphere containing inflammable gas.

## CONTROLLING SPOILT-BANK FIRES

Spoilt-bank fires can become quite a serious problem and methods of control in the South Derbyshire coalfield have been described by J. Carr<sup>9</sup>. Limestone dust and slurry which may be obtained from, say, a water softening plant, are used in conjunction with one another. The limestone dust is used to blanket down the fire; it prevents the emergence of sulphurous fumes, and, according to the



author, on heating produces carbon dioxide, which also helps in the control. It should be pointed out, however, that for this to occur to any extent, the temperature of the limestone must exceed 550°C. The slurry is fed into trenches which are dug so as to prevent fires spreading or, alternatively, it is applied to the faces of burning banks. This problem has also been dealt with by D. Harrington and J. H. East<sup>10</sup>, who point out that the problem of auto-ignition is less for shallow dumps of depths less than 15 ft., provided that they have been well compacted by rolling. After some months' ageing a second layer may be added, provided that an interlayer of clay is inserted. The methods of control of burning areas are discussed and amongst the more normal fire control agents mentioned, such as water sprays, limestone slurry, etc., is the rather surprising suggested use of dry ice as an extinguishing agent.

Experimental work to determine the gas content of unworked coal seams in North Staffordshire has been described by J. I. Graham<sup>11</sup>. Gas is evolved from the borehole at rates of up to two cu. ft. per minute according to the depth, this low rate being thought to be due to the low permeability of the strata. Samples of the coal taken by the mud-flushing method are bottled and the gas evolved at room temperature and 100°C. is measured. The figures obtained are thought to be representative of the coal's gas content *in situ*. The maximum figure obtained indicates a gas content of 250 cu. ft. per ton of coal and it is apparent that the gas drainage of such seams is of major importance, both from the point of view of the increased safety factor, and from the point of view of the gas as a fuel.

#### THE GAS AND DUST PROBLEM

In order to investigate some of the problems associated with mine explosions and fires, small scale experimental technique is essential. Every scientist who wishes to investigate these problems may not have the use of large experimental galleries such as are used by the Safety in Mines Research Board. A very useful small coal dust explosion gallery described by G. W. Grove and G. L. Freas<sup>12</sup> does offer a means of carrying out some experimental work as well as simple demonstrations. It consists of a transparent tube 10 in. long and 2 in. in diameter, having an igniting wire at one end. Into the other end coal dust, or mixtures of coal and stone dusts, may be blown by means of a rubber bulb. The whole apparatus, together with accessories, weighs only 21 lb. and is, therefore, quite portable.

Other methods of assessing explosability have been described by H. A. J. Pieters and J. W. J. Hovers<sup>13</sup>, who prefer the Godbert-Wheeler apparatus or a modified version of it. The modified version described possesses the advantage that it is applicable over a wider range of particle size. They have shown that the influence of ash-forming constituents in coal is of much greater importance than that of admixed inert dust, in this case loess, on the explosability of the dust cloud. Of major importance is the degree of dispersibility of the dust cloud and this is strongly influenced by the water content of the admixed inert material. Mixtures of coals of varying volatile content were found to be more explosive than a single coal having a volatile content equal to the average of the mixture.

#### PREVENTING COAL DUST EXPLOSIONS

Turning to a consideration of large-scale experiments we have an interesting paper by H. C. Howarth and co-workers<sup>14</sup> on the requirements necessary for preventing the propagation of coal dust explosions in rooms. The tests were carried out in three types of rooms all 160 ft. long. These consisted of single rooms 10 ft. and 21½ ft. wide and three wide rooms connected by cross cuts. In the first case it was found that rock dust placed up to

40 ft. from the face must be 60 per cent of the total in order to confine the explosion to the room. If the rock dust terminated 80 ft. away from the face, then the content must be 65 per cent. In the second case, rock dusting up to 40 ft. away from the face, required a content of 60 per cent, but if dusting terminated 80 ft. away from the face, the explosion could not be confined. In the last case, rock dusting up to 40 ft. away from the face required a content of 65 per cent, provided that the initiation of the explosion occurred in the centre room. At 80 ft. again the explosion could not be confined. Generally speaking, therefore, dusting up to 40 ft. away from the face should achieve an inert content of not less than 65 per cent.

The use of rock dust and water in limiting coal dust explosions has been discussed by J. J. Forbes and C. W. Owings<sup>15</sup>. They state that rock dusting should be maintained within 80 ft. of the mine face for adequate protection. This figure appears to conflict with that of the previous workers and also with the figure of 40 ft. given by Fieldner<sup>16</sup> *et al.* in the Annual Report of the U.S. Bureau of Mines.

It is pointed out by H. P. Vowles<sup>17</sup> that the efficiency of limestone dust having a high magnesium carbonate content in the reduction of explosion hazards is due to its dispersibility. This increases with an increase in the proportion of particles of less than 10 $\mu$ . The question of particle size is important from the health aspect, since particles greater in size than 10-12 $\mu$  seldom reach the lungs. On the other hand, particles below about 1 $\mu$  in size do not appear to be associated with lung damage.

Progress in the fight against the dust menace has been described by A. A. Jacobs<sup>18</sup>. With coal dust containing less than 15 per cent volatile matter, the author states that there is no risk of propagation of explosion. Up to 22 per cent limited explosion may occur, but above this figure explosion can propagate readily. The question of respirators is also discussed. Dust respirators hamper respiration and cause inflammation around the nose. The pressure reducing type of respirators operating with compressed air are more effective, but these can only be used by stationary workers and the hose is obviously inconvenient.

#### COAL TREATMENT—THEORY AND PRACTICE

A theory of sedimentation, with particular reference to coal cleansing, has been advanced by F. Langer<sup>19</sup>. The author suggests the application of a correction factor to the calculated rate of fall, to allow for the mutual hindrance of particles in suspension. The factor  $\phi = 1 - \frac{f}{F}$  (where  $f$  and  $F$  are the respective cross-sectional areas of a particle and the clear space around it). The value of this factor changes as the various classes of particles of varying density aggregate. The speed and stroke of a jig calculated on this basis agrees well with the practical value for the cleaning of coal, although it may be pointed out in passing that it works less well when applied to the dressing of ores of higher density.

P. J. van der Walt<sup>20</sup> has described a graphical method for assessing the relative suitabilities of coal washing processes from float and sink data. Formulae for determining the efficiency of a washing process can be derived from the diagrams given by the author and interested readers are advised to consult the original paper.

During the past two years a number of papers of interest have been published on various aspects of coal treatment. W. M. Wallace<sup>21</sup> has discussed the use of jig washers in the treatment of large and small coals, the size of which may vary between 0.02 in. and 8 in. Baum washers, which operate very efficiently for coals of density varying between 1.6 and 1.9, show a greatly reduced efficiency for coals with a density of below 1.45. The author describes a recent French jig which produces a middlings fraction. For the



re-washing of small coal, the author recommends a wash box with automatic control and a false bed of felspar.

H. G. Reyes<sup>23</sup> has recently described a method of cleaning coal by passing it into a series of liquids of increasing density, finally washing with water. For very dense and dirty coals, an aqueous suspension of barytes and colloidal clay is used, while for cleaner coals, solutions of calcium and zinc chlorides or carbon tetrachloride are employed.

A modified type of jig has been devised by Byron M. Bird, in America. It operates with a higher air pressure and has a new kind of air valve, with the result that the bed of coal on the jig plate lifts bodily. This results in the coal particles stratifying more nearly in accordance with their differing densities. It is claimed that the jig is more efficient than the Baum type. It can be used with a wider range of sizes; it has a higher throughput, and uses less water than do British jigs. The reduction in water quantity is important, since it results in a reduced quantity of slurry.

Thermal drying appears to be increasing in America. According to O. R. Lyons and A. C. Richardson<sup>24</sup>, at least 24 fine coal driers are in use in America. These include cascade, continuous pallet, flash, rotary, screen and tray types. In this respect, it is interesting to note that the Institute of Fuel has arranged an extensive programme of lectures on drying during the first four months of this year. Although these lectures cover drying in its many

aspects, the drying of coal, lignite and peat are, of course, included. In view of the increasing use of water for the suppression of dust and the use of wet processes in coal preparation, the problem of de-watering and, or, thermal drying, is of considerable importance.

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## Determination of Minerals with Fluorescence Lamps

Many substances fluoresce in characteristic colours when exposed to beams of invisible radiation emitted by fluorescence lamps, thus providing a quick and widely applicable visual test of value to both scientific and industrial practice. This article, in which readers will find a description of the manifold applications of fluorescence in the mining, engineering and oil industries, has been compiled from material supplied by courtesy of Hanovia Ltd., Slough, manufacturers of the Hanovia fluorescence lamps, who also have published recently a valuable handbook on "Rapid Testing by Fluorescence."

A large number of primary, extracted and manufactured products can be tested instantaneously with the Hanovia fluorescence lamps. These are either high-pressure mercury arcs (the most powerful known sources of ultra-violet radiation) or low-pressure mercury discharge tubes in certain instances. When suitable filters are fitted so as to absorb all the "visible" rays from such sources, the result is a beam of invisible radiation. With Woods glass this has a wave-length of 3,660 A.U.; with other filters it may extend down to 2,537 A.U. When exposed to such beams, many substances fluoresce in striking colours which are characteristic for the material—a substitute will not reproduce the fluorescence of the original. The results must be considered in conjunction with other physical and chemical tests, since fluorescence alone is not an absolute criterion; it does, however, furnish an instantaneous visual test which has very wide application. It involves no injury to the specimen and the whole sample remains available for any subsequent analysis required.

#### FLUORESCENCE TESTING EQUIPMENT

A recent development consists in the production of filters which transmit down to 2,537 A.U. These make it feasible to use as fluorescent sources the low-pressure discharge tubes which generate 90 per cent of their output in a single band at 2,537 A.U., and require so little current that they can be made to work from portable dry batteries as well as from A.C. mains. The intensity of such sources is naturally much lower than that of the high-pressure arcs, and certain tests fail with this wave-length; conversely, 2,537 radiation evokes some fluorescent reactions in which the longer rays fail—tungsten salts, thallium solutions, mercury vapour are instances—and the new sources have other advantages in their portability and availability away from the mains supply.

In general, the use of high pressure arcs is most advantageous, owing to the greater power and wider availability of these sources. In the descriptions following, it may be taken that the work has been done with the high pressure arc and Woods' filter, unless the low pressure discharge is specially mentioned.

The uses of the lamps may be classed under three heads:

- (1) Comparison of samples from "bulk" with material previously delivered and found satisfactory.
- (2) Examination and general analysis of unknown substances, or confirmation of the presence of suspected substances.
- (3) Process control; i.e. following the effect of changes in manufacture on the quality of the product, detection of impurities or of faults.

In some instances the fluorescence lamp will succeed where chemical tests fail. Substances having no fluorescence, or showing similar fluorescent colours, can often be distinguished by simple chemical reactions carried out under the lamp.

Inorganic chemistry, fluorescence helps to detect various metallic and inorganic compounds. From these, specific and very sensitive tests are obtained for, e.g. mercury; chlorine, boric acid and borates ( $5 \times 10^{-7}$ ); uranium ( $1 \times 10^{-10}$ ); rare earth metals ( $0.5-50 \times 10^{-6}$ ) and gallium, scandium and indium ( $2 \times 10^{-8}$ ). Also for silver-halide and zinc-ferrocyanide titrations, phosphoric acid, beryllium, zinc, magnesium, oxygen, molybdenum, cadmium, antimony. There are five tests for aluminium, sensitive to  $1 \times 10^{-7}$ ; titration of  $1 \times 10^{-6}$ . Also for estimation of sulphides, bismuth in calcium salts, sulphites (0.25 mg.), and rhenium (0.01 mgm.).

A negative fluorescence test proves very useful to the sheet metal worker. The sheets are greased for storage, but

must be thoroughly de-greased by detergent washes before being processed. Examination under the fluorescence lamp immediately shows any residual grease.

The action of ultra-violet rays on 13,000 minerals, including many precious stones, has been investigated by Kunz and Baskerville and many later workers. It has been



The compact assembly of the "Detectolite"

found in many instances that the reaction of specimens to the rays is so characteristic that it serves both to identify the stone and even to determine its origin.

Coal of different origin shows variations of fluorescence according to type and age, and the method is valuable for chromatographic analysis of constituents of coal tar.

Portable fluorescence lamps are widely used for the assay of rocks for uranium, and quantities as low as  $1 \times 10^{-6}$  can be detected by a bead test with borax or sodium fluoride. These lamps are also used in prospecting for tungsten ores in the form of scheelite, which, when pure, gives a strong blue reaction to filtered 2,537 A.U. radiation, whereas molybdenum alters this colour through white to yellow as its amount increases; the colour provides a method of quick estimation.

By adding tracers, e.g. fluorescein, to natural waters, it becomes possible to study their movement underground.

Fluorescent examination gives useful indications regarding the origin and processing of shale oil, and with practice it becomes possible to grade fractions by their fluorescence. Most types of petroleum show bluish reactions, but the colour and intensity vary widely for different samples. The portable short-wave lamp has been extensively used in field work for identifying petroleum in sands, shales, drilling cores, and even in soil samples. The long-wave lamp is similarly used in laboratory tests. The presence of petroleum or bitumen in sand or powdered ore can be detected down to 0.1 per cent by sprinkling it on the surface of chloroform, and noting under the lamp if fluorescent streamers are formed.

#### THE TECHNIQUE OF FLUORESCENCE ANALYSIS

Before using the fluorescence lamp, it is necessary to form a clear idea of what information is required and consult recent literature. In some instances the company or its agents can furnish reprints of relevant titles, or put users in touch with appropriate workers.

A great deal of work can be carried out with the fluorescence lamp with few accessories. Non-fluorescent glass vessels are in the store of every laboratory, also porcelain dishes, plates, and tin lids.

To carry out an examination, let the lamp run for five minutes to reach its full output, and if a dark room is

being used, allow several minutes for the eyes to become accommodated.

**Solids.**—Examination is carried out first on the mass and then on a freshly broken surface; any difference in fluorescence will be due to the action of light and air. The surface is then spotted with acid, alkali and water, and changes in fluorescence noted. The substance can then be powdered, both coarsely and finely, and two more observations taken; the fine powder may be blown on to a damp filter paper before making a final observation.

Do not confuse a dull violet colour with a violet fluorescence, as many filters transmit a little violet light which is reflected from white non-fluorescent surfaces. To distinguish between a violet appearance and a violet fluorescence, place a silver coin or piece of polished metal under the lamp also; if the metal and material appear the same colour the material is inert.

**Liquids.**—Examine these in tubes of quartz or non-fluorescent glass, noting the colour reactions at the meniscus and in the body of the fluid. The effect of dilution is important, as this often increases the intensity of fluorescence and may change its colour. The sensitivity of colorimetric reactions is often greatly increased when the samples are examined in the dark rays. Adding acids or alkalis to aqueous solutions often yields valuable information. When examining oils, allow a drop to trickle down a plate of non-fluorescent glass, black-backed, and note the fluorescence of the stream and the drop.

**Volumetric Work.**—Cloudy, turbid or coloured solutions can be titrated without previous dilution or treatment, making use of substances whose fluorescence colour alters at a definite pH value.

The liquid to be titrated is put into a titration vessel, preferably parallel-sided, with a few drops of the fluorescence indicator, and the vessel irradiated with the lamp. The burette may project above the top of the cabinet and the titration be carried out in the usual way, the end point being shown by the appearance, disappearance or colour-change of the fluorescence.

**Photography of Fluorescence.**—The photography of phenomena is quite simple, and prints are not only valu-



A fluorogram, showing scheelite (left) and uranium ore (right) in the rays emitted by the "Detectolite"

able as records, but also reveal details not perceptible to visual inspection.

Among the company's many types of fluorescent equipment, special reference must be made to the Hanovia "Detectolite," a self-contained portable ultra-violet fluores-

cence lamp, A.C. mains or battery operated, for use anywhere.

It embodies all recent developments in fluorescent technique and enables the geologist and prospector to apply the fluorescence test in any circumstances. Mineral faces can be inspected in a mine, drilling cores examined on the spot, etc. The appliance is simply carried to the spot and operated from its own batteries. Examination must, of course, be made in darkness; a black cloth is easily carried in the "sundries" compartment of the case.

This new lamp marks a revolutionary advance in the technique of its application; it extends the use of the method outside the walls of the laboratory into the field, quarry and mine. For many indoor uses also, it is a great convenience to have a source which can be taken to the job, instead of remaining static; a recent instance was the use of the "Detectolite" for examining floors and work benches for traces of radioactive paint by a firm of instrument makers.

The use of the shorter wave-length of 2,537 A.U. widens the scope of the fluorescence test, since certain substances which are inert to longer radiations exhibit brilliant fluorescence under the new lamp. Two outstanding in-

stances are the tungsten minerals—scheelite, powellite and cuproscheelite—and the mercury minerals. The tungsten minerals and salts fluoresce, in various characteristic colours, only in the short-waved rays, whilst the mercury ores, when heated, give off mercury vapour, the presence of which is readily detected by the shadow its casts on a fluorescent screen in the rays of the lamp. Some of the lesser mercury minerals also give direct fluorescence, but the colours are not specific.

Practically all the uranium minerals are fluorescent and respond either to the long or the short rays. This is true also of willemite, calcite, and the familiar range of fluorescent minerals.

**Dimensions.**—The case measures 16 x 14 x 6½ in. Including the dry batteries, it weighs 25½ lb. The burner alone weighs 1½ lb., measures 5 in. in diameter over the face, in which the filter occupies a diameter of 2½ in.

**Electrical.**—The "Detectolite" can be operated either from A.C. mains or from its self-contained dry batteries. The batteries are four cells of Ever-Ready "Flag" type (1½ volts each). They will give about eight hours of continuous or intermittent operation. The discharge tube forming the burner has a "life" of several thousand hours; it can be exchanged or replaced at reasonable cost.

## Centenary of the Indian Geological Survey

The Centenary of the Geological Survey of India was celebrated in Calcutta at a simple function presided over by Mr. N. V. Gadgil, Minister for Mines, Works and Power, Government of India. The ceremony was held in a quadrangle of the Indian Museum and commenced with the unveiling of the geological map of India, writes our Indian Correspondent.

Addressing the gathering, Mr. Gadgil expressed the hope that there would be better appreciation of the rôle played by the Geological Survey to-day and he said that the time had come when, with proper and balanced planning of their resources, they could advance the prosperity of the nation and ensure to every citizen the minimum standard of life and a fair share in all good things in the country. The Geological Survey had a great part to play in order to attain that objective.

The Minister revealed that India produced at present minerals worth well over Rs.750,000,000, whereas the value of the minerals produced 20 years ago was less than Rs.200,000,000. It was true, no doubt, that private enterprise had done much in this field, but it could not be forgotten that the Geological Survey had played its part in laying the foundations of the mineral industry by systematic surveys and laboratory research, extending over a period of 100 years. During this long period the science of geology had made great progress and the Geological Survey of India had contributed to this progress in no small measure. It would also stand to the credit of geologists who were in India during the last 100 years, that they had not been behind geologists in other countries. It was India's aspiration that they should now be ahead of others in the century that opened.

The speaker added that India was supposed to be having very considerable resources of coal, iron ore, manganese and aluminium ore, mica, limestone and building materials. She had fairly adequate reserves of a number of other minerals. It should be their aspiration to expand survey and research activities with respect to all minerals.

Mr. Gadgil welcomed the guests, "representatives of many countries of the world and of learned societies both in India and abroad," and expressed the hope that they would enjoy their stay in India.

Dr. W. D. West, Director of the Survey, recalled how it was the forerunner of other amenities of civilization, like railways and the post and telegraph. He recounted the

vicissitudes the institution had to pass through in its efforts to carry out its aims and objects.

The institution also took pride in having made many original and outstanding contributions on the subject of geology, and Dr. West acknowledged gratefully the liberal assistance rendered by the Government. One of the few post-war development schemes fully implemented was the five-year development plan of the Geological Survey.

Messages of congratulations were received from learned societies and eminent men the world over, including Sir C. V. Raman and the Prime Minister of India, Mr. Jawaharlal Nehru, who referred in his message to the fact that geology was among his subjects when he took his degree at Cambridge just 40 years ago and that his interest in geology had continued since that time.

After the function, the guests went round an exhibition showing various phases of the 100 years' fruitful work by the institution. Visiting geologists next left Calcutta on a tour of places of geological interest in West Bengal, Bihar and Madhya Pradesh.

### FIRST INDIAN DIRECTOR APPOINTED

January, the month in which the Centenary of the Geological Survey of India was celebrated, ended with the departure of Dr. W. D. West, the last of the European heads of the institution.

Dr. M. S. Krishnan has now taken office as the first Indian Director of the Geological Survey of India. Dr. Krishnan joined the Geological Survey of India in 1924 and was mainly engaged in the systematic mapping of mineralized areas, on which he has written many papers. In 1927-29, he delivered lectures at the Forest College, Dehra Dun, and was a part-time Professor of Geology, Calcutta, from 1933-35. His "Geology of India and Burma" has become one of the Indian standard text books.

He had been a member of various official committees in India and delegations to other countries on different occasions. He made a special study of rare minerals abroad before setting up the Rare Minerals Section (now separated from the Geological Survey of India) for the investigation of radio-active and other strategic minerals. He became the Director of the India Bureau of Mines in 1948.

Dr. West, in his five years of office, carried out plans for the expansion of the staff and its activities, and prepared the ground for further growth of the Survey.

## Technical Briefs

### Fan-Ventilator

A fan and ventilator combined, which can draw in cool air or force out hot, has been developed by the General Electric Company, reports Reuter. An automatic control enables the double fans to circulate the air until the temperature has fallen to the pre-selected level, when the fan cuts off. If the temperature subsequently should rise, the fans automatically turn on again. Each fan can be swung round independent of the other, and a three-speed switch provides a choice of gentle, moderate or high-velocity air-flow.

### Titanium Sheet Commercially Available

Rem-Cru Titanium Inc. has made available for the first time commercial quantities of high-strength sheet titanium, reports *Iron Age*, the American periodical in its issue of September 14 last. The new sheet, it is stated, has good formability, can be readily rolled and has a minimum yield strength of 130,000 p.s.i. Depending on rolling temperature and the number of reductions taken, a bend radius of only  $1\frac{1}{2}$ –3 times thickness is required.

Known as RC-130-A, the sheet is a binary seven per cent manganese-titanium alloy. The manganese serves to stabilize the considerable amount of the beta phase and strengthens both the alpha and the beta phases.

### New Agents for Ore Dressing

Sodium Dioctyl Sulpho Succinate is now being manufactured in Great Britain. This chemical is available under the trade name, ALCOPOL O, from Messrs. Allied Colloids (Manufacturing) Co. Ltd., 15, George Street, Mansion House, London, E.C.4.

Sodium Dioctyl Sulpho Succinate has been used in America as a gangue dispersant in the treatment of oxides and non-metallic minerals, for reducing the insoluble content of flotation concentrates and for breaking down agglomerations of heavily mineralized matte on the thickener overflows.

Alcopol O may also be used for the reduction of detrimental skin flotation of fine ore particles, in various metallurgical processes.

The Alcopol wetting agents also find use in the dressing of amalgamation plates. In this connection, Alcopol O replaces treatment of the plates with corrosive reagents used for cleaning purposes.

In most cases, a few hundredths of a pound of Alcopol per ton of ore is adequate for the above purposes.

### Coal Pipeline Plan

The Pittsburgh Consolidation Coal Company—the world's largest bituminous producer—has proposed a plan to transport coal through pipelines, says a Reuter report from Pittsburgh. The company will build a demonstration-size system in Eastern Ohio to move coal as a slurry. The system, consisting of 12-in. pipe and 17,000 ft. long, will cost approximately \$550,000.

The system will work as follows: after mining, coal will be washed and crushed to fine size and then mixed with water to form a slurry. The slurry will be fed into the pipeline and moved through under pressure by means of pumps specifically designed for the purpose. Equipment at the end of the line will remove the coal and then dry it.

The demonstration system will be operated continuously and will be able to handle several thousand tons of coal daily. The pipeline will be built near Cadiz, Ohio, at the company's Georgetown strip mining facilities. The company hopes eventually to extend its plan to general commercial use.

### New Swedish Sulphur Reduction Process

A method of reducing the sulphur content of iron which has been used on an industrial scale by the Domnarvet Iron Mills in Central Sweden for the past six months is stated to have yielded surprisingly favourable results, states a Reuter report from Stockholm. The method, which is known as "Kalling's Roller Furnace Method," after its inventor, Professor B. O. Kalling, involves the use of coke, but the final product is claimed to be equal in quality to Swedish charcoal pig-iron.

Under the Kalling process, the pig-iron flows from the blast furnace into a basin with a capacity of 12 tons. From there it is tapped into a roller furnace, which is being driven at the rate of 34 r.p.m. Burnt lime in the proportion of two per cent of the total weight of the pig-iron, as well as some coal dust, are added, and the furnace is then closed and rotated. When tapped into the roller furnace, the pig-iron contains 0.090 per cent of sulphur; when the furnace starts to rotate the percentage of sulphur decreases, first very quickly and then more slowly to a final percentage of only 0.005. The decrease in the percentage of sulphur to the designed level is stated to take place within half an hour; at the same time, the proportion of silicon is reduced to about ten per cent.

The sulphur is absorbed by the burnt lime, thus producing calcium sulphide; the oxygen, freed, unites with the silicon, yielding silicon-dioxide.

### South African Oil-from-Coal Plant

South Africa's first oil-from-coal plant, which is to be built near Coalbrook, in the Northern Orange Free State, by the South African Coal, Oil and Gas Corporation Ltd., at a cost of £13,000,000, is to produce 35,000,000 gallons of motor fuel annually, according to a Reuter report from Johannesburg. This is equal to 15 to 20 per cent of the country's total petrol consumption. In addition, the plant will produce high-grade Diesel fuel and will supply industrial gas by pipeline to the industrial areas of Vanderbijl Township, to Vereeniging, and, eventually, to Johannesburg. The plant will be so designed that production can be raised to a total of 100,000,000 gallons annually, which is approximately the total consumption of motor fuel in the Southern Transvaal marketing area.

The plant will be located on the Free State side of the Vaal River, almost opposite the new Vanderbijl Township, in the heart of the Coalbrook coal district. The coal seams there lie at an average depth of 400 ft. and range in thickness from 10 to 20 ft. The most up-to-date methods of mechanical cutting, loading and handling will be used in the mines. Much of the equipment needed, particularly that required in the development stages, is already being manufactured in South Africa.

The process to be used by the plant is a modified Fischer-Tropsch method, known variously as the "hydrocol" or "Ruhr-Lurgi" process.

Seven tons of coal will be required to make one ton of petrol, which, at the present pithead price of 5s. a ton, gives a raw material cost of 35s. per ton of petrol produced. The delivered price of imported petrol on the Witwatersrand at present amounts to £22 10s. a ton, excluding customs and excise duties. The plant will, therefore, have a margin of over £20 per ton to cover its production costs. Current customs and excise duties on petrol total 9d. per gallon. This duty will also be levied on Coalbrook petrol as "Satmar," a petrol produced from indigenous sources, by the South African Torbanite Mining and Refining Co., Ltd., is also subject to these duties.



# Metals, Minerals and Alloys

The general metal position continues highly confused, and with the present United States' plan of leisurely progress towards complete control and allocation and competing ideas regarding price fixing, seems likely to continue so for some time to come. One effect of this situation is to weaken the influence of the American market on metal prices elsewhere. Potentially the most important development seems to be the United States' move in conjunction with Great Britain and France to establish some international machinery to control in the first instance 11 scarce strategic materials, viz, cotton, wool, sulphur, copper, lead, zinc, tungsten, molybdenum, manganese, nickel and cobalt. Six international agencies are adumbrated, one of which would deal with sulphur, another with copper, lead and zinc, another with tungsten and molybdenum and the last with manganese, nickel and cobalt. Some 20 other governments have been invited to co-operate in establishing the necessary machinery. The broad idea is the pooling of essential raw materials. As long as this programme holds the floor, the re-establishment of world prices by the ordinary mechanics of trade is likely to be in abeyance. Mr. Disalle, U.S. Price Stabilization Director, has put forward the novel idea that price control should be based on fixed profit margins selected by individual industries based on some period before the outbreak of the Korean War, after production costs had been determined. This might result, he thought, in "some pretty good price roll-backs."

**Copper.**—The topic of major interest is the possibility of stockpile deliveries of copper as well as of zinc being deferred. Various affirmative reports are in circulation but both Munitions Board and G.S.A. spokesmen have refused to commit themselves, or even to indicate whether any official statements are to be made in the future. Negotiations between the Chilean Government and American copper interests looking to an increase in price for Chilean copper, have now been transferred to Washington, where State Department officials and the copper trade are discussing the situation. Should the scheme for international regulations noticed above be found practicable, some of the major difficulties in reconciling American "official" prices with an advance in the prices which Chile would receive for her copper might disappear. Meanwhile, U.S. consumers continue to attempt to bring their inventories up to the maximum permissible level, thus creating a heavy demand for March deliveries. Sales for February delivery, as given at the end of the first week of the month, are said to exceed 83,000 s.tons with March sales already exceeding 11,000 s.tons.

The U.S. Bureau of Mines reports that domestic mine output in 1950 recorded a 20 per cent increase in recoverable copper with a total of 907,000 s.tons, the best since 1944. Continuous operation on a six-day week basis was general and the chief producers in Nevada and New Mexico and one large mine in Arizona worked a seven-day week.

The Premier of Quebec has announced that Noranda Mines will spend \$12,000,000-\$15,000,000 on developing rich copper deposits in the Gaspé Peninsular, promising production for at least 100 years.

**Lead.**—This metal remains so far exempt from control on uses or inventory restriction in the U.S., but the scarcity of other metals, leading to substitution of lead wherever possible, is increasing the tightness of supply, and though official prices are not altered, there is a significant advance in scrap to 15/15.25c. per lb.

A big reduction in the 15 per cent *ad valorem* export surtax in Mexico has been announced. Keen European demand for Mexican lead at 18½/19¼c. f.a.s. Gulf Ports is reported.

The output of the primary refineries in the U.S. last year is reported by the A.B.M.S. as 571,763 tons and the total supply 642,187 s.tons with domestic shipments 499,637 s.tons.

Production of lead in France last year was 61,236 tonnes and in Tunis 21,450 tonnes. Belgian production of lead in 1950 is reported as around 70,000 tonnes, about the same as in 1949.

**Tin.**—The London and Straits price was further advanced this week to the record figure of £1,615. The parity of the U.S. grade A price (183c. per lb.) is £1,464, so further purchase for U.S. disposal seem unlikely unless Government purchases are made.

The possibility of reducing further the amount of tin required by the canning industry is being urgently pursued in the United States. In addition to the success of the American Can Company in the commercial production of "tinless" cans referred to in "Note and Comments" last week, the Weirton Steel Company, which operates the largest tinplate mill in the world with a normal annual capacity of over 1,000,000 s.tons of tin plated products, has announced the perfection of a new and revolutionary electro tinplating process estimated to save 25-30 per cent of the tin required for food packing and containers. Where half-pound weights of tin to the base box are used, the saving is 25 per cent, with three-quarter pound weights, 33.3 per cent, and with the old 1.25 lb., a saving of 45 per cent. Overall savings are claimed from 0.125 to 0.625 lb. per base box. The manager of the chemical division of the General Electric Company reports that for ordinary steel chemical processing a new chemical coating called R-108 can be substituted for expensive and scarce alloys and for the replacement of tin in food containers. Laboratory research during and since the world war has enabled these tin use economies to be developed and their effect is likely to be permanent and increasingly felt. Indonesian output in January is reported as 2,335 tons, slightly below the figure of January, 1950. Texas smelter production in January was 3,211 tons. Although no definite information is available it is considered probable that the control of rubber, now under discussion by the producing and consuming countries in London, will be followed by similar discussions in regard to tin. Stocks in the United States are now estimated at around 185,000 tons, of which at least 130,000 tons are in stockpile.

**Zinc.**—It is reported that some of the major American zinc consumers are so short of supply that they may be unable to reach their permissible 80 per cent consumption. In this case zinc deliveries to Great Britain, scheduled for the first quarter of the year may be delayed. The American Zinc Institute statistics for January show a slight increase in the output of slab zinc to 80,912 s.tons the best since May, 1944.

**Aluminium.**—U.S. output of primary aluminium last year was 718,627 s.tons as against 603,462 s.tons in 1949. Notwithstanding this big increase, Mr. Sawyer, Secretary of Commerce, told the Celler Committee last week that the demand both civil and military for aluminium was likely far to exceed any presently available supply, including everything which might be supplied from Canada. His opinion was that the United States "should get all the aluminium we can, as fast as we can, as cheaply as we can, and from wherever we can."

**Quicksilver.**—The Monte Amiata administration will increase its capital by L.656,000,000 to L.984,000,000. The Company will re-open the Morone mines which have been



closed down for some 20 years. The U.S. Defence Minerals Administration plans to assist the re-opening of domestic mines which producers said they would do if assured of an adequate "floor" price for an extended period.

**Tungsten.**—The wolfram price in Great Britain has advanced again sharply this week and 580/590s. c.i.f. is now mentioned.

The action of the Portuguese Government in imposing a special export tax on wolfram concentrates of Esc.36 per kilo temporarily, at any rate, disorganized the situation in Lisbon and Oporto. Relying on Government assurances that no import duty would be imposed, many exporters are said to have been buying wolfram from the mines and consequently held considerable stocks, which, in view of the new duty could not be sold at ruling foreign market prices without loss. The previous price which averaged Esc.130 with the new tax added represents Esc.166, or 638s. per unit. On Monday some foreign buyers believed to be mainly United States' interests decided to pay this figure, and a large demand quickly developed.

**Gold.**—The Transvaal output in January was 954,791 f.o.z., as compared with 979,588 f.o.z. in January, 1950. The United States' output last year was 2,391,683 f.o.z. compared with 1,949,000 f.o.z. in 1949. Colombian production in October was 33,427 f.o.z. and the ten months' output 320,968 f.o.z. compared with 309,157 f.o.z. a year ago, an increase of 11,811 f.o.z.

## The London Metal Market

(From Our Metal Exchange Correspondent)

The last week has seen a very sharp rise in the Singapore tin price, which has been reflected on the London market; but on Wednesday afternoon the market broke on a rumour that the U.S. authorities were considering stopping stockpile purchases. As Singapore followed the setback, this was carried further on Thursday. The sharpness of the rise has probably been caused by the combination of two factors, the first being the Chinese New Year celebrations which have resulted in the daily offerings of tin in the East being considerably below normal, and the second, the entry into the market of numerous firms which do not normally purchase in Singapore but which have been driven to that market as the only supplier. It is unfortunate that their entry corresponded to a time when only a proportion of their orders were being met, and this tended to cause inexperienced buyers to make bids for a larger tonnage than they actually required. It is expected that as soon as the daily tonnage offered in the East reverts to normal, the tonnage bid for will also decrease with the price receding to a level which will enable shippers to sell at the U.S. frozen price. This is, however, a debatable point, as some quarters consider that there is still insufficient metal on offer in the world to-day to meet real consumption; while others consider that the present high prices will go some way to reducing the consumption for a number of uses, and to this must be added the actions of various Governments to curtail the use of tin, which have not yet been reflected in the demand.

Both the London and Singapore markets are now above the parity of the highest possible quotation in America, and it will not be surprising if the Americans take further steps to try and organize some kind of international allocation scheme for tin.

On Thursday the official close on the tin market was: Settlement price £1,485, Cash Buyers £1,485, Sellers £1,490; Three months' Buyers £1,435, Sellers £1,440. In the afternoon the market was steady. Turnover for the day was 160 tons. Approximate turnover for the week was 625 tons.

The Eastern price on Thursday morning was equivalent to £1,519 12s. 6d. per ton c.i.f. Europe.

## Iron and Steel

Free enterprise steel has finished its career with a fine flourish. The production figures last month show that the industry has continued its record breaking achievements. The January ingot output was the best ever for the first month of the year, being at the annual rate of 15,907,000 tons compared with 15,873,000 tons in January, 1950 and 15,408,000 tons in December. This result, moreover, has been achieved with trade prices which, with the exception of Australian steel prices, are the lowest in any part of the world.

Unhappily, the Iron and Steel Corporation has entered into possession under circumstances which render the continuance of this high rate of production extremely doubtful. The fuel cut is exercising a crippling effect upon the industry and supplies of imported ores and scrap fall considerably short of current requirements.

It is, moreover, now officially confirmed that a rise in prices is imminent. The Minister of Supply, Mr. George Strauss, has stated in a written Parliamentary reply that an Order authorizing an advance in iron and steel prices would be issued as soon as possible. In fairness it should be added that these unfavourable developments are not due to nationalization. The same problems must have been confronted under private ownership. Nevertheless, it is now the responsibility of the Steel Corporation to ensure the provision of ample supplies of material for the iron and steel plants, and to wage unceasing combat against the growing inflationary pressure.

As a special inducement to the scrap merchants to intensify their quest for home scrap the Ministry has authorized as from Monday last an increase in their trade allowance from 3½ to 5 per cent on the maximum prices of scrap iron and steel, and the first response has been the employment of a team of 100 men in the North of England who have been given the task of combing the whole of the area for additional supplies which are required to feed the blast furnaces.

Although the pressure for supplies of steel is intense, deliveries to the big consumers are fairly substantial. The restriction of exports has enabled the steel makers to reduce the arrears in their deliveries to home destinations, although it is foreseen that shortages may develop as the re-armament programme gathers momentum.

A more immediate anxiety is the shrinkage in the output of pig iron. As between November and January there has been a fall in output of 10,000 tons per week. This is creating serious difficulties in the foundry trade. Pig iron allocations have had to be reduced, stocks are rapidly disappearing and blast furnacemen are falling behind with their deliveries. No improvement in the position is anticipated, as long as the cut in fuel supplies continues. In fact, further deterioration is feared.

**Tinplate.**—The new prices for sheets and tinplates have not yet been announced, but for both products the demand exceeds supply, with mills employed to capacity. For iron and steel distributed coal stocks are estimated as equivalent to only 2.5 winter weeks' consumption.

## Coal

A cold snap in the week ended Feb. 2 is held by the Ministry of Fuel to be mainly responsible for an increased coal consumption by the electricity and gas undertakings, and for a net decrease that week of 336,000 tons in distributed stocks, which are now at their lowest total this year (10,119,000 tons) compared with 12,248,000 tons at the corresponding period last year.

The improved output trend is being maintained. Deep-mined production in the week ended February 10 at 4,316,100 tons, was the best of the year to date, all divisions except Kent registering gains over the corresponding week; and it raised the cumulative total to 24,742,800 tons as against 24,310,100 tons for the same period last year. Manpower continues to increase; overall it is nearly 8,000 greater than at the beginning of the year and 1,500 more are employed at the coal face; but absenteeism, at 14.78 per cent is 1½ per cent greater than it was a year ago; and during the past fortnight the O.M.S. overall has receded from 1.25 tons to 1.23 tons and at the face from 3.20 tons to 3.18 tons. The great extension of the Saturday morning shift is not performing the miracles sometimes claimed for it, and after an operational period of six weeks the industry's total saleable output is approximately 900,000 tons short of the Attlee target.

## FEBRUARY 15 PRICES

## COPPER

Electrolytic ... .. £202 0 0 d/d

## TIN

(See Metal Notes above for Thursday's Metal Exchange prices)

## LEAD

Soft foreign, duty paid ... .. £136 0 0 d/d  
Soft empire, including secondary lead ... .. £136 0 0 d/d  
English lead ... .. £137 10 0 d/d  
Remelted ... .. £126 0 0 d/d

## ZINC

G.O.B. spelter, foreign, duty paid ... .. £151 0 0 d/d  
G.O.B. spelter, domestic ... .. £151 0 0 d/d  
Electrolytic and refined zinc ... .. £155 0 0 d/d  
Hard ... .. £135 0 0 ex depot  
Remelted ... .. £145 0 0 ex depot

## ANTIMONY

English (99%) delivered, ... ..  
10 cwt. and over ... .. £325 per ton  
Crude, 10 cwt. and over ... .. £250 per ton

## NICKEL

99.5% (home trade) ... .. £406 per-ton

## OTHER METALS

Aluminium, £124 per ton.  
Bismuth, 22s. 6d. lb.  
Cadmium, 17s. 3d./18s. lb.  
Chromium, 5s. 3d. lb.  
Cobalt, 15s. 6d. lb.  
Gold, 248s. f.o.z.  
Iridium, £65 oz. nom.  
Magnesium, 1s. 6d. - 2s. lb.  
according to quantity.  
Osmiridium, £35 oz. nom.  
Osmium, £70 oz. nom.  
Palladium, £8 10s. oz.  
Palladium (scrap), £8 oz.  
Platinum, £27/£33 5s. nom.  
Rhodium, £45 oz.  
Ruthenium, £30 oz.  
Quicksilver, £73 10s. nom.  
ex-warehouse.  
Selenium, 25s. nom. per lb.  
Silver (bar), 78½d. f.o.z. spot  
and forward.  
Tellurium, 14s. 4d. lb.

## ORES, ALLOYS, ETC.

Bismuth ... .. 60% 13s. per lb. c.i.f.  
50% 12s.  
Chrome Ore ... ..  
Rhodesian Metallurgical (lumpy) £11 per ton c.i.f.  
" " (concentrates) £11 per ton c.i.f.  
" " Refractory £10 12s. per ton c.i.f.  
Baluchistan Metallurgical ... £11 11s. per ton c.i.f.  
Magnesite, ground calcined ... £26 - £27 d/d  
Magnesite, Raw ... £10 - £11 d/d  
Manganese, Best Indian (Nominal)  
Molvdenite (85% basis) (Nominal)  
Wolfram (65%), U.K. 580s./590s. nom. c.i.f.  
Tungsten Metal Powder 35s. 6d. nom. per lb. (home)  
(for steel manufacture)  
Ferro-tungsten ... 33s. 6d. nom. per lb. (home)  
Carbide, 4-cwt. lots ... £30 18s. 9d. per ton  
Ferro-manganese, home £30 5s. 11d. per ton  
Ferro-manganese, export Nom.  
Brass Wire ... 2s. 2½d.  
Brass Tubes, solid drawn ... 1s. 9½d.

## Mining Men and Matters

Mr. A. H. Bowhill has been elected a director of Perak River Hydro Electric Power.

Mr. W. H. Harrison has been appointed to the board of Johannesburg Consolidated Investment.

Mr. G. W. McCulloch has joined the staff of De Beers Consolidated Mines.

Mr. F. B. Michell, who as reported in this column last week will be a member of the O.E.E.C. Mission which is leaving for the United States next month to study techniques in the preparation and dressing of non-ferrous ores, will be participating as the representative of the Malayan Chamber of Mines.

Mr. G. C. Morgan has taken up a post with National Smelting.

Mr. W. H. Williamson has been elected a director of Anglo-Ecuadorian Oilfields.

The American Institute of Mining Engineers will hold their annual meeting in St. Louis, Missouri, on February 19-22, 1951.

The Iron and Steel Corporation of Great Britain have announced that they will be in occupation of their new offices at 1, Chester Street, London, S.W.1, from February 12, 1951 (Telephone: SLOane 0818).

The Ross Institute of Tropical Hygiene has announced that its Course in Tropical Hygiene for Planters and Miners will be held from Monday, July 23 to Friday, July 27 inclusive. There is no fee for the course and the names of those proposing to attend should be sent as soon as possible to Mr. L. G. Ponsford, Organizing Secretary, Ross Institute of Tropical Hygiene, Keppel Street (Gower Street), London, W.C.1.

## OBITUARY

## ROBERT C. STANLEY

We learn with deep regret of the death of Mr. Robert Cooks Stanley, chairman of the International Nickel Company of Canada, in America, last Monday, at the age of 74.

Mr. Stanley, who trained as a mining engineer, devoted all his business life to the nickel industry, with which his name will always be predominantly associated. He joined the International Nickel Company of New Jersey in 1901, and the company was incorporated as a Canadian undertaking in 1916. He was elected president in 1922, when the industry was experiencing the slump which followed the first world war. He realized the necessity of developing industrial uses for nickel with the cessation of the armament demand, and to this end he organized a vigorous programme of scientific research to enlarge the field of industrial applications of the metal which became a model for all organizations with similar design. During the decade following his election as president, he also, in conjunction with Mr. John Agnew, intensively developed the Sudbury mines of the company to reach the huge ore reserve position which gave the enterprise so strong a foundation. In 1928, the merger with the Mond Nickel Co. was effected largely through his instrumentality. This enabled him to centre the distribution of the company's products in Europe and in 1931 the enlarged Acton precious metals refinery was opened. Mr. Stanley made great efforts to secure Russian support for a world consolidation of platinum interests, but, though nominally successful, it became in practice a dead letter. The International Nickel Company rendered great services to the Allies in the last world war, and even before its outbreak did everything possible to curtail supplies of nickel and other metals to the Nazis. For these services Mr. Stanley received the grateful thanks of the British Government, although as an American citizen he was ineligible for the honours which would doubtless have been bestowed upon him. For many years Mr. Stanley's practice was to visit Europe in the Spring and study developments and prospects at first hand, and at such times the London office was a port of call for the leaders of the metal industry. In the last few years the effects of a long and strenuous business life seemed to tell on him, and two years ago he resigned the presidency in favour of Dr. J. S. Thompson, though he remained chairman of the board up to the time of his death.

Mr. Stanley was a director of many other important companies including the Amalgamated Metal Corporation, Henry Gardner & Co., The American Metal Company, United States Steel Corporation, the Chase National Bank, the General Electric Company and the Canadian Pacific Railway Company. He was the holder of numerous honours and awards and a supporter of many philanthropic agencies.

# The Mining Markets

(By Our Stock Exchange Correspondent)

Most Stock Exchange firms have again had a busy week. Private investors have continued to sell nationalized steel stock and re-invest in other markets. Funds have had a poor week with selling predominating, although a rally set in on Wednesday afternoon. Official support has been lacking and institutional investors have focused their attention on nationalized steel stock standing at a small discount to their ultimate compensation prices.

A feature of the week has been the setback in coppers, most of the leading Rhodesian companies showing substantial falls from last week's peak prices. On Tuesday a partial recovery occurred but this was insufficient to cover earlier losses. This downward tendency is attributed to profit-taking and to the technical position in the market.

Reports indicate that a fair proportion of the money raised by these sales is being re-invested in gold shares. Rand producers are benefiting from the premium price of gold, and market circles now believe that this premium may well remain a permanent feature. Selective buying of gold shares has taken place in both Johannesburg and London. Doornfontein and Western Reefs were particularly favoured. Orange Free State issues have also been firm. Those mines which are nearest production being singled out for quiet buying.

The higher price of tin lead to increases in share prices of some of the leading producers, but the trend was by no means general. Investors are still disposed to be very cautious in this market, although the present price levels discount a price for the metal, estimated in market circles to be below £1,000 per ton.

Nigerian Tin shares eased on the West African political situation, although there was little selling. Geevours was a steady market after going ex dividend on Wednesday, the first day of dealing for the new account. Beralt fell a

further 1s. Reports from Lisbon state that wolfram exporters are experiencing difficulty owing to the suddenness of the imposition of the new export tax. They are unable to dispose of stocks in hand at present market prices, without incurring losses. In this connection an error was made in last week's estimated taxation figures for Beralt. The tax, of course, amounts to nothing like £2,000 per ton of ore exported, but to about £450 per ton, or roughly a quarter of the company's estimated gross revenue at the price of 545s. a unit then in force.

West African Gold shares were marked down on the result of the Gold Coast elections. As this had been anticipated in London for some months past, there was little selling. Current prices heavily discount the political risk. On Wednesday a few cheap buyers appeared, and the market became firmer.

Dollar shares have been a strong market due to the scarcity of metals in the U.S.A. and the continued upward spiral of Wall Street.

In London, oil shares were the brightest section. Much of the switching from steel stocks has gone into this market. Prices were further stimulated by the announcement in Parliament of an agreement with the Socony-Vacuum Oil and the Standard Oil (New Jersey) whereby the dollar content of their oil would be reduced. In return they would be left free to trade in the U.K. on the same terms as British companies. This result will be achieved by supplying much of the oil required from Middle East sterling sources, and the purchase by the American companies of large quantities of oil from British and European producing and refining concerns. Trinidad Petroleum Developments were bought on rumours of good drilling results in Trinidad, but no definite news has been received. The January production figures for Ultramar pleased the market. The Mercedes field produced 669,332 bbl. against 649,431 in December, an average increase of 639 bbl. per day.

FINANCE	Price Feb. 14	+ or -	Feb. 14	Price Feb. 14	+ or -	Feb. 14
African & European.....	66/3	-2/6	O.F.S.	14/3		
Anglo American Corp.	26 1/4	+1	Alpha F.S.A.	26 1/4	+7 1/2	
Anglo-Trench	40 1/2	+3/9	Blinkop	6 1/2	+8 1/2	
Anglo Transvaal Consol.	15 1/2	-3d	Central Mining F.S.	17/6	-6d	
Camp Bird	46 1/2	+7 1/2	Freddies	9/9	-3d	
Central Mining (Z. shrs.)	24		Freddies N.	11 1/3	-3d	
Consolidated Goldfields	39 1/4	-1 1/2	F.S. Geduld	27 1/2	+4 1/2	
Consol. Mines Selection	6 1/2	-1/3	Geofries	19 1/2	-6d	
East Rand Consols	31 1/2	-1/2	Harmony	22 1/2	-1/2	
Rand Mines	7 1/2	-1/2	Inden Estates	25 1/2	+1/6	
General Mining	10/3	-1/3	Middle Wits.	48/9	-1/2	
H.E. Prop.	3/8	-1/2	Osbits	18/9	-1/2	
Henderson's Transvaal	41/10	-7 1/2	President Steyn	38 1/4	-1/2	
Johannes	12 1/2	-1/2	St. Helena	12/6	+6d	
Rand Mines	7 1/2	-1/2	U.F.S.C. & G.	72	-1/2	
Rand Selection	35 1/2	-7 1/2	Virginia Del.	14/6	+1/6	
Union Corporation	21	-1/2	Welkom	45 1/2	+7 1/2	
Vereeniging Estates	6	-1/2	Western Holdings	3 1/2	+1/2	
Wits.	35 1/2	-7 1/2				
West Wits.	21	-1/2				

RAND GOLD	Price Feb. 14	+ or -	Feb. 14	Price Feb. 14	+ or -	Feb. 14
Blyvoors	52/6	+7 1/2	WEST AFRICAN GOLD	2 1/2	-1 1/2	
Brakpan	22/9	-1/2	Amalgamated Banket	7/8	-9d	
City Deep	32	-1/2	Ashanti	31/2	-2/9	
Consol. Main Reef	52	-1/2	Bibiani	11/9	-1/2	
Crown	52	-1/2	Bermang	3/7 1/2	-7 1/2	
Dagdas	31 1/2	-1/2	G.C. Main Reef	3/10 1/2	-3d	
Dominion Reefs	33 1/2	+1 1/2	G.C. Selection Trust	9/8	-1/2	
Doornfontein	29 1/4	-1/2	Konono	2/3	-1 1/2	
Durban Deep	29 1/4	-1/2	Swabu	4/9	-1 1/2	
E. Dagdas	29 1/4	-1/2	London & African Mng.	1/6	-1 1/2	
E. Geduld	24	-1/2	Lyndhurst Deep	1 1/2	-1 1/2	
E. Rand Props.	3 1/2	-1/2	Marb.	2/3	-1 1/2	
Geduld	41/10	-7 1/2	Nanwa	1 1/2	-1 1/2	
Grootvlei	24 1/2	-1/2	Taqnah & Abosso	9 1/2	-1 1/2	
Libanon	22/9	-1/2				
Lupatol Vlei	22/9	-1/2	AUSTRALIAN GOLD	4/9	-1 1/2	
Mariveau	6 1/2	-1/2	Boulder Perseverance	16/6	+3d	
Modderfontein B.	22/9	-1/2	Gold Mines of Kallacort	7/8	-9d	
Modderfontein East	32/6	-1/2	Great Boulder Prop.	1/6	-1 1/2	
New Kleinfontein	22/6	-1/2	Great Western Consol.	22/6	-1 1/2	
New Pioneer	21/6	-1/2	Lake View and Star	23 1/2	-1 1/2	
Randfontein	17/9	+3d	Mout Morgan	19/9	-1 1/2	
Randfontein Deep	17/9	+3d	North Kalgudi	10 1/2	-1 1/2	
Rose Deep	8 1/2	+1 1/2	Parina	15 1/2	+1/9	
Simmer & Jack	13/3	-1 1/2	Sons of Gwalia	12 1/2	-1 1/2	
Spring	3 1/2	-1/2	South Kalgudi	11 1/2	-1 1/2	
Sub Nigel	18/3	-1/2	Western Mining	11 1/2	-1 1/2	
Van Dyk	22/6	-1/2	Witona	11 1/2	-1 1/2	
Venterspost	22/6	-1/2				
Vlakfontein	22/6	-1/2				
Vogelstruys	22/6	-1/2				
West Trientfontein	22/6	-1/2				
Wit Rand Consolidated	48 1/2	+7 1/2				
Western Reefs	40 1/2	+1 1/2				

MISCELLANEOUS GOLD	Price Feb. 14	+ or -	Feb. 14	Price Feb. 14	+ or -	Feb. 14
(contd)						
G.F. Rhodesian	9/2	-1 1/2	on week			
London & Rhodesian	5/9	+1 1/2				
Metapa	3/9	-1 1/2				
Myosote	6 1/2	+3d				
New Guinea	1/2	-1 1/2				
Nundudroog	3/10 1/2	+4 1/2				
Ooreum	3/10 1/2	+4 1/2				
Oroville	11 1/4	-3d				
St. John d'El Rey	35 1/2	+3/9				
Zams	37 1/2	-2 1/2				
DIAMONDS						
Anglo American Inv.	3 1/2	-1 1/2				
Cast	36/3	-1 1/2				
Cons. Diam. of S.W.A.	3 1/2	-1 1/2				
De Beers Deft. Bearer	57/6	-1 1/2				
De Beers Pld. Bearer	17 1/2	-1 1/2				
COPPER						
Chartered	71/6	-1 1/2				
Indian Copper	5 1/2	-1 1/2				
Messina	111/3	-1 1/2				
Nchanga	6 1/2	-1 1/2				
Rhod. Anglo-American	59/6	-2 1/2				
Rhodesian Selection	37/6	-1 1/2				
Rhokana	21 1/2	-1 1/2				
Rio Tinto	24	-1 1/2				
Roan Antelope	20/6	-1 1/2				
Selection Trust	47/6	-1 1/2				
Tanks	49/3	+1 1/2				
Tharsis Sulphur Br.	55 1/2	-1 1/2				
TIN (Eastern)						
Anglo-Burma	4/9	-1 1/2				
Ayer Hitam	25 1/2	+1 1/2				
Batu	15 1/2	+1 1/2				
Gopeng	15 1/2	+1 1/2				
Hongkong	15/3	-7 1/2				
Ipon	35 1/2	-7 1/2				
Samutong	11 1/2	-1 1/2				
Kepong Dredging	14/9	-1 1/2				
Kinta Tin Mines	17/8	+1 1/2				
Kramat Pulu	5 1/2	-1 1/2				
Malayan Dredging	24/6	-1 1/2				
Pahang	15/9	-1 1/2				
Penakalen	11 1/2	-1 1/2				
Petaling	12/3	-1 1/2				
Rambutan	21/6	-1 1/2				
Siam	11 1/2	-1 1/2				
Southern Kinta	15 1/2	-1 1/2				
Malayan	28/6	-1 1/2				
Sungei Kinta	27/6	-1 1/2				
Tekka Taiping	12/6	-1 1/2				
Tromoh	32 1/2	-1 1/2				

TIN (Nigerian and Miscellaneous)	Price Feb. 14	+ or -	Feb. 14	Price Feb. 14	+ or -	Feb. 14
Amalgamated Tin	13/3	-1 1/2				
Beralt Tin	28/9	-1 1/2				
Bisich	4/6	-3d				
British Tin Inv.	18 1/2	-1 1/2				
Ex-Lands Nigeria	8 1/4	-1 1/2				
Gangang Tin	19 1/2	-3d				
Gold & Base Metal	19 1/2	-3d				
Iantar Nigeria	8/9	-1 1/2				
Ios Tin Area	11/9	-1 1/2				
Kibitang Prospects	6/9	+6d				
Kaduna Syndicate	13/9	-1 1/2				
London Tin	5 1/4	-1 1/2				
Ribon Valley	12 1/4	+1 1/2				
United Tin	1/3	-1 1/2				
SILVER, LEAD, ZINC						
Broken Hill South	55 1/2	-1 1/2				
Burma Corporation	4/3	-3d				
Consol. Zinc	34 1/2	+3d				
Lake George	26/9	-3d				
Mining Trust	5 1/2	-1 1/2				
Mount Isa	38/9	-7 1/2				
New Broken Hill	31/6	-1 1/2				
North Broken Hill	75 1/2	-1 1/2				
Rhodesian Broken Hill	21 1/4	-3d				
San Francisco Mines	66/3	-3 1/2				
Trepca	3/7 1/2	-1 1/2				
MISCELLANEOUS						
BASE METALS & COAL						
Amal. Collieries of S.A.	3 1/2	+1 1/2				
Associated Manganese	78 1/2	+8d				
Chinese Engineering	2/8	+1/9				
C.P. Manganese	57/9	-1 1/2				
Natal Navigation	6	+1 1/2				
Wankie	22 1/2	-1 1/2				
Witbank Colliery	4 1/2	+1 1/2				
CANADIAN MINES						
Dome	33 1/2	-1 1/2				
Hudson Bay Mining	112 1/2	+2				
International Nickel	87 1/2	+1 1/2				
Mining Corp. of Canada	28 1/2	+5				
Noranda	118 1/2	+1 1/2				
Quebec	110 1/2	+1 1/2				
OIL						
Anglo-Iranian	6 1/2	+1 1/2				
Apex	43 1/2	-1 1/2				
Attok	25 1/2	-1 1/2				
Burmah	63/9	+5 1/2				
Canadian Eagle Bearer	35 1/2	+4 1/2				
Mexican Eagle	25 1/2	+1 1/2				
Shell	4 1/2	+1 1/2				
Ungei Kinta	28 1/2	+1 1/2				
T.P.D. Leasehold	32 1/2	+2 1/2				
Ultramar	31 1/2	+7 1/2				

## Miscellaneous Mining Progress Reports

There was much of interest in the reports issued by Rhodesian, West African and Australian mining companies giving outputs and developments for the December, 1950, quarter. Those of other companies, working properties in different parts of the world, also gave production for specific periods together with interesting mining news.

### RHODESIAN GOLD & COPPER

The leading Rhodesian gold producer—Cam and Motor—announced about the same profit, £75,110, for the December quarter as in the previous three months. Additional to the usual costs, the mine incurred £8,240 capital expenditure which was no doubt in connection with preparations for renewed shaft sinking, in view of the mine's satisfactory developments, referred to by the chairman at the meeting in December.

Sherwood Star announced an increase of £1,400 in profit to £4,498. Small capital expenditure was made but no development done.

Mining work on Rezende gave varying results on both the Rezende and Liverpool sections. A great improvement in milling results, however, was announced, with a profit of £3,557 as against only £663 in the September quarter.

No development or shaft sinking was done on Thistle-Etna during the last three months of 1950, but milling of 14,900 tons resulted in a profit of £1,900—similar to the September quarter.

The Gold Fields Rhodesia subsidiary—Motapa—opened up 435 ft. of ore of 2.9 dwt. from a development footage of 4,460 ft. Profit for the quarter again tapered, being £16,292 against £19,833 in September quarter and £23,076 for the three months to June, 1950. Labour shortage and metallurgical difficulties continue to beset operations.

Encouraging developments accompanied the announcement by Phoenix Prince of a profit of £12,878 for the December quarter. Of the 906 ft. developed on reef, 793 ft. gave an average value of 3.99 dwt.; payability was 87.5 per cent.

The old Globe & Phoenix announced that at the end of 1950 there was a mine tonnage of reserve ore of 180,800, containing 170,100 oz. gold; average value 18.82 dwt.

Although Wanderer's operations during the quarter were adversely affected by shortage of underground natives, the profit from the 83,200 tons milled was substantially better—£2,548 against £1,547. Of the footage sampled, 30 per cent was payable, value 3.1 dwt.

Good values were found on the Vubachikwe mine belonging to London and Rhodesia. The Connaught mine made a profit of £1,183 and on the Pickstone ore was opened up on the second and third levels yielding up to 17.8 dwt.

The small pilot plant, erected on the Dalny, belonging to Falcon Mines started up during the December quarter and is now treating 2,500 tons monthly. Mine developments are good and on eighth level ore of 6.1 dwt. has been opened up. Working profits for the period, from Sunace and Bay Horse mines, totalled £12,930.

There was an expansion in Roan Antelope and Mufulira production for six months ended December 31, 1950. Mufulira produced 42,618 tons blister copper while Roan's production was 36,348 tons. The latter's estimated profit for the six months was £2,695,000 and Mufulira's £3,796,000.

### WEST AFRICANS

Ashanti Goldfields reported that for the four months since the end of its financial year (September 30) to end January, estimated profits amount to £363,022. On the

27 level (Main Reef) a crosscut S.W. opened up ore giving 27.1 dwt. over 30 ft. On the 33 level, in a crosscut N.E., the width narrowed to 13 ft. but value rose to 40.7 dwt.

The sister undertaking, Bibiani, reported similarly for four months a profit of £73,598 against £113,646 for corresponding 1949-50 period. Working costs and general expenses have increased.

Rather more footage was driven on Taquah during the December quarter—2,212 ft. Of the 1,300 ft. sampled 545 ft. averaged 5.97 dwt. over 51 in. (payability 41.9 per cent).

For the three months October-December, 1950, Ariston Gold announced an increased revenue of £320,342, while the total profit was £149,964—or an increase of £2,321 over the same period of the previous year. The amount is subject to Gold Duty, depreciation, London expenses, etc.

During the December quarter, Konongo Gold developed 1,381 ft. Of the 900 ft. of driving sampled, 23 per cent was payable. The 9 S drive on Boabedroo gave 220 ft. of payable ore value 27.4 dwt., making a total length now fully exposed on this drive, 380 ft. averaging 23.7 dwt. per ton over 58 in. Work was continued on Odumase 20th level to locate the downward extension of the reef, but no values were disclosed.

The progress report of Lyndhurst Deep announced that total development for December quarter was 1,090 ft. No pay values were found in driving but 90 ft. of rising gave ore of 5.1 dwt. per ton over 45 in. During the period 7,535 tons of ore were crushed in Konongo's mill, yielding 2,369 oz. gold.

### AUSTRALASIAN & MISCELLANEOUS

Amongst the Australian producers to give a good account of operations was South Kalgurli. For the 12 weeks to December, a profit of £9,441 was announced as against £7,631 for the previous similar period.

Zinc Corporation reported that for the year 1950 ore treated amounted to 389,992 tons. Lead concentrates produced were 77,612 tons, containing 57,081 tons lead and 1,160,076 oz. silver; zinc concentrates 75,618 tons.

New Broken Hill treated for the year 1950, 165,685 tons. Lead concentrates 18,671 tons containing 13,726 tons lead and 310,719 oz. silver; zinc concentrates 38,137 tons.

From October 6 to end December, the Blackwater Mines made a working profit of £3,595. Underground work included the deepening of the main shaft to 98 ft. below the 16 level.

The dredge belonging to Clutha River during the December quarter was working virgin ground and production was 1,202 oz.

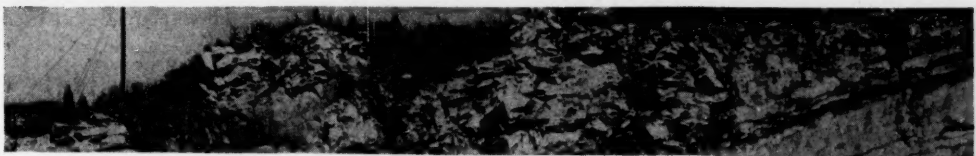
A tonnage of 99,994 was treated by Indian Copper in the December quarter. Refined copper produced amounted to 1,825 tons; rolled brass, 1,870 tons; yellow metal circles, 415 tons. Rolled copper produced 12 tons. Development work was carried out on Mosaboni and Badia with satisfactory payable values.

San Francisco Mines of Mexico reported that during the December three months, 161,150 tons of ore were dealt with, producing 13,701 tons of lead concentrates; 2,070 tons copper and 20,396 tons zinc.

Another Mexican undertaking—Fresnillo—milled 167,303 tons; producing 10,039 tons lead concentrates; 1,911 tons copper and 11,317 tons zinc.

Emmeror and Loloma. These two Fijian mines crushed during the 12 weeks to January 10, 32,076 tons and 4,004 tons for a yield of 11,499 oz. gold and 5,963 oz., respectively.





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## Company News & Views

### Alpine (Barborton) Reduces Working Costs

The scale of operations at Alpine (Barborton) Gold Mine expanded considerably during the year ended June 30, 1950 compared with the previous year. The tonnage mined and treated rose from 21,000 tons to 29,150 tons, or approximately 40 per cent, and development footage advanced showed an increase over the previous year of 1,457 ft. to 2,513 ft., of which 946 ft. proved payable—equivalent to 57 per cent. The increase in the tonnage treated and the higher price for gold which was operative for the last 9½ months of the year under review enabled this work to be carried out, whilst at the same time increasing the working profit which, exclusive of development, increased from £13,543 to £23,541.

Although working costs fell by 1s. 9d. to 46s. 2d. per ton milled, development charges at £5,516 against £2,795 represented a rise of 1s. 1d. to 3s. 9d. per ton milled, bringing the total working expenditure per ton milled to 49s. 11d. against 50s. 8d. in 1949.

The profit and loss account showed gross revenue better at £90,957 against £65,245, and although mining and administrative expenses were higher, profit for the year which was carried forward, amounted to £9,776 against £4,750 in 1949.

With regard to the current year's operations the chairman, Mr. Wedderburn, stated that results have fluctuated, but that on the average reveal a working surplus somewhat less favourable than that shown in the past year. Surplus liquid assets of the company have been steadily increasing over the past three years, and at June 30, 1950, stood in the balance sheet at £26,719.

### Improved Outlook for British Malayan Tin Syndicate

British Malayan Tin Syndicate, which was registered in 1924, took on a new lease of life when it acquired in 1945 a tin mining property at Carnkie, near Redruth, Cornwall, and options over large deposits of mine tailings in the Carnon Valley, Cornwall. For the year ending June 30, 1950 20,909 tons dry weight of sand tailings were treated, from which 73 tons of tin concentrates were recovered having an average assay value of 35.9 per cent tin, which realized £12,721 after smelting charges and transport costs had been deducted. However, mining and administrative expenses amounted to £17,944, giving a loss on the year's operations of £5,203 compared with a loss of £7,166 in 1949.

During the year a great deal of work was accomplished in preparation for the installation of the new classification plant, the greater part of which has in fact been installed since the company's fiscal year end. The company is still in the midst of reorganizing its plant, and the directors have stated that when the new ore washing unit is delivered at the end of this month, the stamp batteries can be restarted and the throughput can be gradually increased to 900 tons per week.

Despite these initial teething troubles prospects for the Syndicate during the current year have improved considerably; a substantial increase in the price of tin has taken place; the tailings treated have shown a marked increase in tin recovery; so that better results can be expected in the near future.

### Half-yearly Results of Roan Antelope

The estimated profit before taxation of Roan Antelope Copper Mines for the six months ended December 31, 1950, amounted to £2,695,000, which compares with £778,000 for the corresponding period in 1949. Of the 36,348 l.tons (28,948 l.tons) of blister copper produced in this period, 35,648 l.tons (27,448 l.tons) were sold, realizing

£5,904,000 (£3,126,500). Despite the rise in operating costs by £820,000 over the 1949 figure to £2,837,000, working profit has nearly doubled, the relevant figures being £3,067,000 against £1,109,500 in 1949. Copper stocks at Roan during the period under review increased by 700 l.tons bringing the closing stock to a total of 18,705 l.tons, valued at £1,381,000, compared with the closing stock at the end of 1949 of 18,007 l.tons valued at £1,216,500. London expenditure and loan stock interest amounted to £60,000 (£53,000), and the provision for replacements and obsolescence at £450,000 showed an increase of £100,000 over that provided for in 1949.

### —Mufulira Copper Mines

Mufulira Copper Mines estimated profit before taxation for the six months ended December 31, 1950, was £3,796,000 compared with £1,623,000 for the corresponding period in 1949. From the 42,618 l.tons blister copper produced, 41,118 l.tons (32,349 l.tons) were sold, realizing £6,735,000 (£3,683,000). Although costs nearly doubled, rising from £1,895,000 in 1949 to £2,778,000 in the period under review, this was more than offset by the increase in working profit, which advanced from £1,788,000 to £3,957,000. Copper stocks at Mufulira during the period under review increased by 1,500 l.tons to 20,025 l.tons, valued at £1,153,000. London expenditure was higher by £9,000 at £42,000, and the sum of £350,000 provided for replacements, was the same as that provided in the corresponding period in 1949.

## Company Shorts

**Dominion Reefs (Klerksdorp)** have announced that No. 15 level crosscut intersected the reef beyond the fault, and where cut, the reef assayed seven dwet. per ton over a width of 36 in., equivalent to 252 in. dwet.

**Holfontein (T.C.L.) Gold Mining**, at its extraordinary meeting held in Johannesburg on February 7 last, approved the special resolutions to wind up the company. Holfontein's issued capital is £850,000 in 10s. shares and are currently quoted in London at about 1s.

**Witwatersrand Deep** have advised holders of registered option certificates that the period for which the options were granted to take up shares of 5s. at 7s. 6d. per share, and which expires on March 30, 1951, had been extended to March 31, 1952.

**Jantar Negotiates Columbite Contract.**—The Jantar Nigeria Company has announced that a contract has now been concluded to sell their output of columbite for 1951 at \$35.84 per unit, equivalent to £832 per ton for 65 per cent combined columbium/tantalum pentoxide c.i.f. New York City. This compares with the average price realized during 1950 of £406 per ton.

**The United Kingdom Committee of Ordinary Shareholders in Tanganyika Concessions** have announced that a satisfactory response has been received to the appeal for funds issued on December 14, 1950. This response, it is stated, indicates that a very substantial body of Ordinary stockholders supports the committee, the purpose of which is to provide a channel of communication between the U.K. Ordinary stockholders and the board of directors in Southern Rhodesia.

**Ashanti Goldfields Form New Company.**—A new wholly owned private company, West African Finance Corporation, Ltd., has been formed by Ashanti Goldfields Corporation to acquire Ashanti's existing share holdings in West African companies. The new company which will hold and manage investments has an authorized capital of £500,000 in £1 shares, of which 400,000 shares will be issued to Ashanti.

The first directors are: Major-General Sir Edward L. Spears, Mr. A. d'Anvers Willis and Sir David Waley, all of whom are directors of Ashanti Goldfields Corporation. The new secretary will be Mr. E. W. Morgan.

At September 30, 1949, Ashanti Goldfields' shareholdings in other companies were recorded in the balance sheet at £354,633, and had a market value of £588,621. Shares in other companies (unquoted at cost) amounted to £6,490. Two of Ashanti's principal investments are Bibiani (1927) and Taquah and Abosso Mines, both of which operate in West Africa.

## Topical News in Brief

**More Uranium in Czechoslovakia.**—Uranium ore is reported to have been discovered near Pribram, Czechoslovakia, on the site of a famous old silver mine.

**Rio de Oro Phosphate Deposits.**—Rich phosphate occurrences have been found in Rio de Oro as a result of investigations carried out by order of the Spanish Direccion General de Marruecos y Colonias.

**German Coal Winning Plant for Turkey.**—DEMAG-A.G., Gutehoffnungshuette, Oberhausen A.G., and the Siemens group secured recently an order, in competition with U.K. firms, for the erection, at an approximate cost of \$1,500,000, of coal winning plant in the Zonguldak mines, Turkey.

**French West African Bauxite Deposits to be Exploited.**—The Pechiney group intends to exploit newly discovered large bauxite occurrences in Dabola, French West Africa. A power plant is to be constructed in the vicinity of the deposits in order to make possible local manufacture of aluminium metal.

**French Plant for Greek Mines.**—According to an Athens correspondent of the *Echo des Mines et de la Metallurgie*, the Société Minerais et Métaux has secured, against stiff U.S. competition, a Greek order for the construction of three lead and zinc ore washeries.

**Austrian Anhydrite to be Exploited.**—The State-owned Austrian Nitrogen Works, Ltd., Linz, Upper Austria (U.S. Zone), intend to exploit the large gypsum deposits near Wien, Styria (British Zone), rich in anhydrite which is becoming increasingly important for the production of sulphuric acid.

**Exploiting Turkey's Chrome and Manganese.**—The Minotra A/S, a Norwegian firm, which is co-operating with a Turkish group, has recently commenced to exploit chrome and manganese deposits. These deposits are situated partly along the Black Sea coast and partly in the Kythava, Biledek and Izmir districts. Production for this year is estimated at 60,000 tonnes of chrome ore and 80,000 tonnes of manganese ore.

**Coal Deposits in East Pakistan.**—Lignite deposits have been found over a wide area in Mymensingh district and Habiganj in Sylhet, East Pakistan, it is learned. The Geological Survey of Pakistan, it is understood, is making examination of the deposits with a view to finding out the places where the deposits are the thickest, of best quality, and most accessible, with the ultimate object of working them on a large scale.

**Inter-African Bureau of Geology Recommended.**—The establishment of an inter-African Bureau of Geology was recommended by the first conference of the Scientific Council of Africa, South of the Sahara, which was held recently in Nairobi.

The council recommended that maps of the Continent should be made uniform, and that special regional maps should be prepared on subjects such as geology, climatology, etc.

**Scottish Miners' New Stone Mining Record.**—A horizontal mining team at Wellesley Colliery, Buckhaven, Fife, Scotland, who are boring their way to a coal seam three miles under the bed of the Firth of Forth, have established a new stone mining record by cutting 118½ yd. in a month. They have now covered 1,740 yds. of the 2,500 yds. to the farther limits of the seam beneath the sea. "If we keep this up," an official said, "we should be producing within a year about 700 tons of coal a day."

**Indian Research into Felspar Crystals.**—Prof. V. Raman, India's foremost scientist, is now carrying on fundamental research in felspar crystals, which are expected to open up new possibilities for research in mineralogy. Felspar is one of the most important rock-forming minerals; the chief components of which are silica, lime and soda. Although pure felspar is supposed to be colourless, many of the varieties are finely tinted owing to the presence of various minerals. These tints, according to Prof. Raman, are produced by what he calls the incipient separation of the different components at various stages.

**S. Rhodesia Chrome Stockpile Awaits Transport.**—500,000 tons of chrome ore—worth more than £7,000,000—are stocked throughout Southern Rhodesia awaiting rail transport to Beira for shipment to the U.S. Mr. G. H. Parkinson, general manager of the Rhodesian Chrome Mines, said in an interview recently, that about 400,000 tons of chrome ore were stockpiled in Selukwe alone, and that the ore had been lying beside the railway line for years. "At Selukwe," said Mr. Parkinson, "we mine about 15,000 tons a month. If the Rhodesia Railways were to remove 30,000 tons a month, our stockpile would decrease by half that amount. At this rate it would take about two and a half years to finish the stockpile."

**Brazilian Manganese Ore for U.S.A.**—Considerable progress has been made with the construction of a port at Macapá, Federal Territory of Amapá, Brazil, to facilitate shipment of manganese ore to the U.S.A. under the arrangement concluded with the Bethlehem Steel Corporation, states the *Fortnightly Review*, issued by the Bank of London and South America. A pier now being built will accommodate steamers up to 24,000 tons, and modern equipment will make possible their loading in about ten hours. Work is also proceeding in connection with the railway, which will link the port with manganese deposits in the interior, and in the meantime, a certain amount of ore is being transported by road.

**Increased Exploitation of Austria's Raw Material Resources.**—Austria's investment programme for 1950/52, which envisages an expenditure of 18,000 million Austrian schillings (of which over one-third comes from counterpart funds), will probably have to be revised drastically because of the growing world shortage of raw materials, states a Reuter report from Vienna. The country will have to utilize to a greater extent her own raw materials resources, particularly those of non-ferrous metals, such as copper, zinc, lead and antimony, as well as those of iron ore, coal and bauxite. It will, therefore, be necessary to invest larger sums than envisaged under the original programme, as well as to curtail planned investments in producer goods industries.

**Lead—Zinc Facilities in India to be Developed.**—The Metal Corporation of India, Ltd., is to receive a loan of Rs. 3,000,000 from the Industrial Finance Corporation for development of its Zawar lead-zinc mines and improvements to its smelter at Udaipur, Mewar State, India. India's domestic requirements of pig lead exceed 10,000 tons annually and must be met with imports. Thus, expansion projects are needed.

The corporation began operating its flotation plant in April and production had reached about 400 tons of zinc concentrates and 200 tons of lead concentrates in September. All lead concentrates are being smelted on the property to obtain virgin lead (Metal Corporation is said to be the only firm in India producing virgin lead from indigenous ores); the zinc concentrates are to be exported, however, as there are no facilities in India for smelting them. Negotiations are being carried on with buyers in the U.S.A. and Belgium for these exports.

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## ALPINE (BARBERTON) GOLD MINE INCREASED REVENUE

The Fourteenth Annual General Meeting of the Alpine (Barberton) Gold Mine, Limited, was held at River Plate House, E.C.2, on Wednesday last.

Mr. A. H. M. Wedderburn, chairman of the company, presided.

The following is the chairman's statement, which was circulated with the report and accounts:

The sanction of the Court was obtained to the reduction of the company's capital authorized by the first special resolution passed at the last annual general meeting of the company. At the same time, and in accordance with the second special resolution passed at the same meeting, the authorized capital of the company was restored to the original figure. The balance sheet presented to shareholders on this occasion gives effect to those changes. To balance the reduction in the issued capital, the items "Mining Claims and Rights" and "Mine Development" are heavily written down and preliminary and issue expenses and the previous debit balance of profit and loss account have been entirely written off.

The increase in revenue from gold recovered from £63,895 to £90,835 is principally due to the increase in the price of gold which was operative for the last 9½ months of the year under review. Although the tonnage treated rose from 21,000 to 29,150 tons, the average recovery grade fell from 7.09 to 5.31 dwt. per ton and the gold recovered consequently rose only slightly, viz.: from 7.443 ton 7.738 *Loz.* Working expenditure, exclusive of development, shows a slight fall from 47s. 11½d. to 46s. 2d. per ton milled. In the result the working surplus, exclusive of development, is increased from £13,543 to £23,521.

The amount spent on development was substantially increased and the estimate of ore reserves has risen as at June 30, 1950, from 44,059 to 47,482 tons.

The profit for the year, after debiting development, expenses payable in England and depreciation, is £9,776 compared with £4,750 in the previous year. The liquid resources of the company, while showing a substantial improvement, are not yet more than sufficient for its requirements, and it is proposed that the profit for the year be carried forward.

The results of the operations at the mine during the current year have fluctuated but on the average show so far a working surplus somewhat less favourable than that shown in the past year. Development is continuing and at the deeper levels of the mine has reached No. 20 level.

The thanks of the company are due to the members of the local board in South Africa, to the company's general managers and consulting engineers and to the mine manager and all members of the mine staff.

The report and accounts were unanimously adopted.

## January Mine Returns Gold

### WEST AFRICA

**Amalgamated Banket.**—56,192 tons yielded 8,411 oz.; profit £32,602.  
**Ariston.**—27,500 tons yielded £107,806; profit £48,099.  
**Ashanti.**—20,000 tons yielded 16,044 oz.; net mines profit £90,443.  
**Bibiani.**—30,000 tons yielded 6,272 oz.; net mines profit £16,470.  
**Bremang.**—704,800 yds. from 4 dredges yielded 3,041 oz.  
**Gold Coast M.R.**—8,257 tons yielded 2,953 oz.; profit £9,495.  
**Konongo.**—3,885 tons yielded 2,434 oz.; profit £10,444.  
**Marlu.**—38,500 tons yielded 4,415 oz.; profit £18,524.  
**Taqua.**—24,000 tons yielded 5,736 oz.; profit £11,007.

### INDIA

**Champion.**—12,810 tons yielded 5,303 oz.  
**Mysore.**—6,000 tons yielded 1,370 oz.  
**Nundydroog.**—16,508 tons yielded 4,433 oz., including 134 oz. from old tailings.  
**Ooregum.**—8,533 tons yielded 2,041 oz.

### AUSTRALIA

**Boulder Pers.**—(Jan. 3-Jan. 30) 8,240 tons yielded 1,959 oz.  
**Central Norseman.**—(Jan. 3-Jan. 30) 12,317 tons yielded 3,617 oz.  
**Central Victoria.**—(Dec. 13-Jan. 30) 174,508 cu. yd. yielded 470 oz.  
**Croesus Prop.**—(Jan. 3-Jan. 30) 6,250 tons yielded 1,077 oz.

**Gold Mine of Kalgoorlie.**—(Jan. 3-Jan. 30) 11,743 tons yielded 3,522 oz.  
**Kalgoorlie Enterprise.**—(Jan. 3-Jan. 30) 3,263 tons yielded 1,073 oz.  
**Kalgurlie Ore.**—(Jan. 3-Jan. 30) 14,415 tons yielded 3,336 oz.  
**New Coolgardie.**—(Jan. 3-Jan. 30) 4,012 tons yielded 2,065 oz.

### MISCELLANEOUS

**Brit. Guiana Cons.**—76,126 cu. yd. dredged yielded 497 oz.  
**Bushtick.**—10,800 tons yielded 1,176 oz.; loss £678.  
**Cam & Motor.**—20,500 tons yielded £57,872; profit £24,862.  
**Clutha.**—(Dec. 24-Jan. 19) Dredge worked 448 hours yielding 275 oz.  
**Frontino.**—7,161 tons yielded 3,344 oz.  
**Motapa.**—23,500 tons yielded 2,294 oz.; profit £4,119.  
**Rezende.**—6,500 tons yielded £13,053; profit £957.  
**St. John D'el Rey.**—33,800 tons; value of output £214,164, including £4,200 from re-treated roasted sands.  
**Thistle-Etna.**—4,900 tons yielded 487 oz.  
**Wanderer Cons.**—26,400 tons yielded 1,969 oz.; profit £110.

## Tin

### MALAYA

**Ampat.**—56 tons conc.  
**Batu Selangor.**—14½ tons conc.  
**Berjuntai.**—48½ tons conc.  
**Iph.**—32½ tons.  
**Jelepang.**—31 tons conc.  
**Kampung Lanjut.**—82½ tons conc.  
**Kamunting.**—206½ tons conc.  
**Kinta Kellas.**—16 tons.  
**Kinta Tin.**—27 tons.  
**Klang River.**—25 tons conc.  
**Kramat Tin.**—29½ tons conc.  
**Kuala Kampar.**—252½ tons conc.  
**Kuchai.**—60 tons conc.  
**Larut.**—99½ tons conc.  
**Lower Perak.**—109½ tons conc.  
**Malaysiam.**—5 tons.  
**Rahman.**—39½ tons.  
**Rantau.**—43½ tons conc.  
**Rawang Conc.**—62½ tons conc.  
**Rawang Tin.**—75½ tons conc.  
**Renong.**—6½ tons.  
**Southern Kinta.**—326½ tons conc.  
**Sungei Kinta.**—27½ tons.  
**Taipang.**—84½ tons conc.  
**Tambah.**—19 tons conc.  
**Tanjong.**—104 tons.  
**Tongkah Harbour.**—107½ tons conc.

### NIGERIA

**Amalgamated Tin.**—366 tons tin conc. and 53 tons columbite.  
**Bisichi.**—52 tons tin and 12 tons columbite.  
**Ex-Lands Nigeria.**—55 tons.  
**Filani.**—3.9 tons.  
**Gold & Base Metal Mines.**—43 tons conc.  
**Jantar Nigeria.**—20 tons tins and 20 tons columbite.  
**Keffi.**—13½ tons conc.  
**Naraguta Extended.**—8½ tons.  
**Naraguta Karama.**—10½ tons.  
**Naraguta Tin.**—18½ tons tin and 6 tons columbite.  
**Nigeria Cons.**—5 tons conc.  
**Ribon Valley.**—5 tons conc.  
**Rukuba.**—1½ tons.  
**South Bukuru.**—8½ tons.  
**Tin Fields of Nigeria.**—2 tons.  
**United Tin Areas.**—6 tons conc.

### MISCELLANEOUS

**Bangrin Tin.**—86½ tons.  
**Beralit Tin.**—9 tons tin conc. and 157 tons wolfram conc.  
**Geevor.**—5,212 tons yielded 74 tons (65 per cent Sn).  
**Siamese Tin.**—86½ tons.  
**South Crofty.**—1,498 tons ore yielded 23 tons tin.

## Coal & Miscellaneous Base Metals

**Amal. Collieries.**—551,059 tons coal.  
**Apex Mines.**—87,828 tons coal.  
**Rhodesia Broken Hill.**—1,920 tons zinc and 1,150 tons lead.  
**South African Coal Estates.**—163,305 tons coal.  
**Springbok Colliery.**—89,666 tons coal.  
**Vryheid Cononaton.**—49,724 tons coal and 13,514 tons coke.  
**Wankie Colliery.**—175,750 tons coal sales and 8,911 tons coke sales.  
**Witbank Colliery.**—127,665 tons coal.

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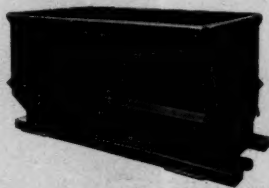
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